

DEVELOPER EXTENSION PROJECT MANUAL



Manual Fee \$40.00
REV: 1/2014

INFORMATION SHEET

RONALD WASTEWATER DISTRICT King County, Washington

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Mondays through Fridays [excluding holidays]

3. Commissioners:

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Gretchen A. Atkinson
Brian T. Carroll
George R. Webster
Arnold H. Lind

4. Board of Commissioners Meetings:

Every other Tuesday of each month at 5:30 P.M.

5. Ronald Wastewater District General Manager:

Michael U. Derrick

6. District Engineers:

CHS Engineers, LLC.
12507 Bel-Red Road, Suite 101
Bellevue, WA 98005-2500
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7. District Attorneys:

Hendricks-Bennett, PLLC

8. Manual Fee: \$40.00

**9. Developer Extension Project Manual
Accepted 5-1-2007, Resolution No. 0718**

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LOOSE FORMS AND LETTER AVAILABLE:

- Application
- Review of Application
- Checklist
- Contract
- Performance and Payment Bond
- Conveyance
- Certification
- Release of Encumbrance
- 11-Month Inspection Form

SECTION A: DEVELOPER EXTENSION PROCESS

INTRODUCTION

This manual is a guide through the necessary steps to determine whether a developer extension is needed and the steps required to obtain service from Ronald Wastewater District by an extension of the existing sanitary sewer system. The cost of this manual is \$40.00.

The process includes submitting application, signing a contract for service, paying connection charges, determining classification of service, preparing and reviewing of plans, submittals to agencies, certification of construction costs and inspection, revising plans to construction, recording of easements, bill of sale and conveyance of sewer facility, one year warranty, and final acceptance.

REVIEWING REQUEST FOR DEVELOPER EXTENSION

Prior to entering into an agreement with the District, the applicant will complete an application form with attachments and submit a \$500.00 application fee. The District will determine:

1. If they will proceed with an agreement and any special requirements.
2. The fees that will be required after the APPLICANT has determined who will do the design (the applicant's engineer or the District's consulting engineer).

FEES

Fees to be paid to the District shall include but are not limited to:

1. Project Deposit - The Developer shall deposit a fee, which shall be determined by the District after review of application and preliminary plan. The fee shall be payment for the costs to be incurred by the District for design, inspection, engineering, legal, financial or other services performed by or for the District relating to this project.
2. Connection Charge - The Developer's contribution to the existing sanitary sewer system and the District's facilities (General Facilities Charge). The connection charge will include amounts for each Residential Customer Equivalent (RCE) and front footage charge (Local Facilities Charge) where applicable. The Connection charge will be paid prior to issuing a side sewer permit.
3. Administrative Fee - A fee of 15 percent of all costs described under Project Deposit covering District administration costs, including recording fees, will be charged at the end of the project with the final reconciliation letter. The 15 percent fee does not apply to the design costs if design is done by the District's Engineer.
4. System Isolation Deposit - Prior to start of construction, a \$1,000.00 system isolation deposit shall be paid to the District. The isolation device shall be in place and inspected by the District prior to the start of construction, it shall remain in place and be functional during construction and shall not be removed without the authorization of the District. The \$1,000.00 deposit shall be forfeited if the above stipulations are not adhered to.
5. Guarantee Deposit - A deposit or bond to be paid to the District of \$2,000.00 or 10% of the construction cost, whichever is greater. The method of payment will be determined by the District and due with the project deposit (see 1). The guarantee deposit to be held for 1 year after conveyance. A potential refund may be issued following the 11 month inspection.

Developers requiring special provisions in their contract or their facilities can expect that the total charges to be billed by the District and/or its consultants will be increased beyond that of a similar development without the special provisions. Additional charges will be incurred by the Developer when additional research, documentation or review is required.

Some special provisions that cause additional charges to be incurred by the Developer are listed below:

1. latecomer agreements
2. use of pumping systems
3. designs that require modification to the District's standard design practice
4. alternate assessment practice
5. early service connection
6. design or construction changes
7. installations not in accordance with plans requiring additional inspections
8. capacity flow studies

OUTLINE OF DEVELOPER EXTENSION PROCESS

To initiate the Developer extension process, the Developer shall complete the application form contained in this manual and submit it with the application fee and required attachments to the District. After the application has been submitted, the District will review the information for serviceability, calculate the connection charge and prepare a formal contract.

A Developer Extension Agreement shall be prepared by the District for signature by the Developer and the District. This contract must be signed and appropriate fees paid prior to the review of plans. The Developer shall then submit plans to the District to be reviewed or can have the District's engineers prepare the plans. The District approves construction plans and receives approvals and permits from all necessary agencies, then holds a preconstruction conference. During construction the District will have an inspector present to insure that the system is installed to District standards. When all pipe and related facilities are in place, easements covering those portions of the system outside public right-of-way shall be completed and returned to the District. The plans shall be revised to conform with construction records and they shall be given to the District for use as a permanent record. The Developer is responsible for submitting approved plat copies to the District. When easements, revised plans, and construction of the system is approved, a conveyance of the Sewer Facility form shall be prepared and executed by the Developer whereby the completed system shall be turned over to the District. The Developer is responsible for completing a Certificate of Cost and submitting it to the District. At the end of the one-year period, the project shall be inspected and any items needing repair shall be rectified by the Developer before the bond or cash Guarantee Deposit is released.

Construction Engineering and Inspection - All construction engineering and inspection will be done by the District or its consultants on a time-and-expense basis and shall be paid for by the Developer.

INFORMATION FOR DEVELOPER'S ENGINEER AND CONTRACTOR

The Developer is responsible to inform its consultants, its contractor, and all subcontractors of the District's requirements. We recommend that the Developer provide its engineer/architect and contractor with the "Developer Project Extension Manual."

SELECTION OF ENGINEER

The Developer may have its own engineers prepare the construction plans and specifications and have them reviewed by the District's engineers, or they may request that plans be prepared by the District Engineer.

- If Prepared by District Engineers
The District's engineers will prepare construction plans and specifications on a time and material basis at the request of the Developer.
- If Prepared by Developer's Engineers
Plans prepared by the Developer's engineer shall be reviewed by the District's engineers to see that they conform to the District's standards. The costs of the District engineer's review of the plans shall be paid by the Developer. Standards for plan preparation are included in the "Developer Project Manual."
The District recommends pump station and pump system plans and specifications be prepared by the District.

ENGINEERING SUBMITTALS

The Developer shall furnish three (3) copies of the proposed plat map at a scale of 1 inch = 100 feet or 1 inch = 50 feet with contour intervals of 5 feet or less and proposed road profile sheets prior to the District's ordering of engineering design or plan review from its engineer. Final plat map shall be furnished as soon as possible. The Developer shall also provide the description, location and elevation of all benchmark data available on the project site and this information, wherever possible, shall be indicated on the maps furnished by the Developer. The datum used shall be the District's and not an assumed datum.

**SECTION B: APPLICATION
APPLICATION FOR DEVELOPER EXTENSION
TO SANITARY SEWER SYSTEM**

1. The undersigned applies to Ronald Wastewater District, King County, Washington, for permission to construct and install an extension of the District's sanitary sewer system located in public rights-of-way under the District's franchise, and/or on easements over private property to connect to the District's sanitary sewer system, all of which are subject to the approval of the District.
2. A check for the \$500.00 application and review fee for this application is attached.
3. The proposed extension will be installed in roads and/or easements and/or on other approved public rights-of-way and shall be for the use and benefit of the District and of the property legally described as follows:

The common street address of the property is _____,

The legal description of the property is: _____

4. (a) Describe the type of improvements planned for the above-described property, i.e., single family residences, other individual residential units or commercial usage, and the proposed number of units.

- (b) Attached to the application shall be two copies of each of the following:
 - A preliminary plan setting forth the proposed development.
The plan shall include property boundary lines, indication of type of development, if any, location of roads, building and/or other important features, type of building construction, and the number of units shall be stated.
 - A final or preliminary plat map or property map of the property to be developed.
 - A contour map of the area with a five-foot contour interval or less. Datum shall be based on the most recent King County Aerial Survey with benchmark locations shown.
 - Existing and proposed roadway profiles.
5. Set forth the proposed date for construction of the project and the anticipated completion date for the project:

Start of Construction: _____

Completion Construction: _____

6. Set forth common street address and telephone number of Developer:

7. (a) Have you made an application to the municipality having jurisdiction of the project for a building permit or for approval of a plat, a short plat, a rezone or a planned unit development? If yes, list the name of the agency or agencies and type of action requested.

Name of Agencies

Type of Action

Dates Applied

- (b) Have you prepared an environmental checklist, negative declaration of EIS?

Yes _____ No _____

If yes, list name of lead agency:

Date of application: _____

If an EIS, negative declaration or checklist has been completed, attach a copy.

8. Attached to this application is a Developer Extension checklist. Please advise if there are any items on the checklist with which you have a question or you cannot comply.

9. Do you want the District's consultants to prepare the plan for the proposed project?

Yes _____ No _____

Prepared by:

Date:

Developer:

Address:

Telephone No.:

Engineer:

Address:

Telephone No.:

Architect:

Address:

Telephone No.:

Contact Person:

Address:

Telephone No.:

RONALD WASTEWATER DISTRICT DEVELOPER EXTENSION CHECKLIST

PROJECT: _____ PHONE: _____

DEVELOPER: _____ PHONE: _____

ENGINEER: _____ PHONE: _____

CONTRACTOR: _____ PHONE: _____

A. APPLICATION

<u>Page</u>			DATE	APPRVD/ AMOUNT
3/4	1.	Preliminary plans (2 copies) submitted to District.	_____	
1	2.	Developer Project Manual purchased by Developer.	_____	
4	3.	Application submitted to District.	_____	
1/4	4.	\$500.00 Application Fee paid.	_____	_____
12	5.	District review and approval of application.	_____	
1/2	6.	District Engineer estimates design/construction budget	_____	
	7.	Board hearing if application is rejected by Commissioners.	_____	
2	8.	Forward information to Attorney for Contract and Resolution preparation.	_____	

B. CONTRACT AND PLAN REVIEW

27	1.	Contract signed by Developer and returned to District.	_____	
1/2	2.	Fees Paid:	_____	
28	<input type="checkbox"/>	Contract	_____	_____
29	<input type="checkbox"/>	Developer Extension Project deposit	_____	_____
30	<input type="checkbox"/>	Connection Charge	_____	_____
30	<input type="checkbox"/>	Guarantee Deposit	_____	_____
30	<input type="checkbox"/>	System Isolation Deposit	_____	_____
28	3.	Contract and Resolution executed by Commissioners and recorded.	_____	

<u>Page</u>			DATE	APPRVD/ AMOUNT
3	4.	Submit three (3) plans to District for design or review.	_____	
3	5.	Plans returned to Developers engineer for revision, if necessary.	_____	
4	6.	Application for permits and agency approvals.		
	(a)	King County Wastewater Treatment Division	Mailed _____	_____
	(b)	City of Shoreline Road Cut Permit	Mailed _____	_____
	(c)	Seattle Water Department	Mailed _____	_____
	(d)	_____	Mailed _____	_____
4	7.	All agency approvals received.	_____	
4	8.	Plans approved and letter to Developer.	_____	
33	9.	District Engineer prepares construction cost estimate for Performance Bond	_____	
C. REQUIREMENTS BEFORE CONSTRUCTION				
	1.	Contractor's references submitted to District.	_____	
	2.	Contractor licensed and bonded by District Per Resolution 93-11.	_____	
	3.	Reference checked and Contractor approved.	_____	
32/33	4.	Insurance certificate submitted to District (per Section 00700-13 of Specifications)	_____	
33/39	5.	Performance bond, if required, submitted to District (per Section 00700-15 of Specifications).	_____	_____
34	6.	Third party (off-site) easement(s) secured and submitted to District for recording.	_____	
31	7.	District mails pre-construction notice (see Pre-Construction List)	_____	
31	8.	Pre-construction conference held prior to any construction (min. 7 days notice).	_____	
	9.	Cut sheets submitted to District (min. 2 days prior to construction).	_____	

<u>Page</u>			DATE	APPRVD/ AMOUNT
	10.	Contractor gives District/CHS notice of intent to start construction.	_____	
	11.	Notice given for road cut start, if applicable. (District call City)	_____	
17/31	12.	Plug or tightline bypass inspected and approved.	_____	
D. CONSTRUCTION				
	1.	District approves construction start.	_____	
	2.	District Engineer releases cut sheets.	_____	
	3.	District Engineer inspects project.	_____	TO _____
	4.	Channels shall accommodate TV camera, Approximate dimensions 32" long x 6" diameter.	_____	
	5.	Air test, lamp, jet cleaning and inspected and passed.	_____	
	6.	Contractor has new system mandrel and telespected with District present. Telespection tape to District	_____	
	7.	District Engineer sends a copy of completed air test to KCDNR WTD.	_____	
	8.	Punch list submitted to Contractor, Developer and District.	_____	
	9.	Punch list items inspected and revised punch list submitted to Contractor, Developer and District. if necessary. Completed punch list to District.	_____	
	10.	Acceptance inspection and approval.	_____	
	11.	Letter to District by District Engineer stating project has been inspected and is construction complete.	_____	
E. AFTER CONSTRUCTION				
	1.	Letter to Developer requesting as-builts, easements, conveyance of sewer facility, certification of costs, approved plat.	_____	
35	2.	Latecomer agreement executed and recorded, if applicable.	_____	

<u>Page</u>		DATE	APPRVD/ AMOUNT
34	3. Easement restoration releases sent to property owners.	_____	
	4. Contractor performs additional work on easement restoration, if necessary.	_____	
01545	5. Easement restoration releases signed and submitted to District.	_____	
F. REQUIREMENTS BEFORE ACCEPTANCE			
	1. As-builts and Tee Sheets submitted to District for review.	_____	
43	2. Easements and On-From-To submitted to District for review.	_____	
17	3. As-builts, etc. returned to Developer's Engineer for revisions, if necessary.	_____	
17	4. As-builts, easements and On-from-to approved.	_____	
17	5. Easements executed and returned to District. Mailed _____	_____	
43/44	6. Easements and conveyance of sewer facility and certification sent to County for recording.	_____	
	7. Record number and put into the permit database.	_____	
4	8. Developer submits final plat to District.	_____	
	9. 1/4 section(s) and general sewer map revised by District.	_____	
	10. Developer extension deposits reconciled and brought current. Including 15% Administration Fee. Mailed _____	_____	_____
35	11. District pays latecomer amount(s) to proper parties, if necessary.	_____	_____
43/44	12. Conveyance of sewer facility and certification of costs executed and returned to District. Mailed: _____	_____	
36	13. Project cost submitted to accountant for inclusion in plant-in-service.	_____	
36	14. Resolution accepting Conveyance, Certification, M.L. Easement and Project.	_____	

<u>Page</u>		DATE	APPRVD/ AMOUNT
36	15. Letter sent to Developer stating project has been accepted and one year warranty has started.	_____	
G. FOLLOWING ACCEPTANCE			
	1. District authorizes removal of plug.	_____	
30	2. District refunds system isolation deposit.	_____	_____
34	3. District releases performance bond.	_____	_____
	4. District issues side sewer permit.	_____	_____
	5. District inspects side sewer.	_____	
	6. New accounts to A/R clerk.	_____	
H. FINAL ONE YEAR CLOSEOUT			
45	1. 11 Month Inspection.	_____	
	2. Developer makes warranty corrections, if necessary.	_____	
	3. District sends Developer letter stating project is warranty inspection complete.	_____	
	4. District makes Final acceptance.	_____	
30	5. District releases Guarantee Deposit and any remaining funds on deposit.	_____	
43/44	6. Commissioners execute Release of Encumbrance. For Developer Extension Contract.	_____	

PROJECT COMPLETE

PRESIDENT _____

SECRETARY _____

MANAGER _____ COMMISSIONER _____

REVIEW OF APPLICATION DEVELOPER EXTENSION

1. Upon the submission of the preliminary plan to the District, the District Engineer and General Manager will set forth the sewer capacity necessary for the contemplated improvement. Does the anticipated sewer flow exceed the capacity of the contemplated improvement and/or system?

Yes _____ No _____
2. Can property serve by gravity? _____
3. Is a latecomer's charge, connection charge, or other charges against the real property subject of the developer extension?

Yes _____ No _____
4. Is the project in an annexed area? _____
If no, has the Owner requested the District to initiate the annexation process?

Yes _____ No _____
5. Does this project require an amendment to the District's comprehensive plan?

Yes _____ No _____
6. District has reviewed application. _____

Comments: _____

Prepared by: _____

Accepted by: _____

Rejected by: _____

SECTION C: ENGINEERING AND CONSTRUCTION DESIGN CRITERIA

Where special conditions exist some of the following requirements may be modified at the District's discretion.

General

1. Plans shall be on Plan-Profile mylar 24 x 36 or 22 x 34 inch sheets (Plan and Profile on same sheet). Profile grid shall have 10 horizontal lines per inch and 1 vertical line per inch equally spaced. See Sample Plan at the end of this Section.
2. Horizontal scale shall be 1 inch equals 50 feet. Vertical scale shall be 1 inch equals 5 feet or 1 inch equals 10 feet.
3. Note Datum on plan (Datum shall be North American Vertical Datum or NAVD 88. Subtract 3.58 feet to get NGVD 1929).
4. Note Bench Marks on plans.
5. Include General Notes on plan as shown at end of this Section.
6. Plans shall be stamped by a licensed Professional Engineer.
7. Vicinity map shall show project's location relative to the nearest intersection.
8. Plans shall have a North arrow.
9. Names of streets shall be indicated on the plans.
10. Designs shall be in conformance with District rules, regulations and resolutions.
11. Plans shall meet the Department of Ecology design requirements except where more stringent District requirements are noted.
12. In conjunction with prudent comprehensive planning and to insure the availability of sewer service to adjacent parcels, it is the District policy to have the Developer extend the system to certain points on a project site that will facilitate future extension of the system. This will in most cases cause the system to be extended to the opposite side(s) of the project site from the point of available service.
13. Right-of-Way and Monuments: All rights-of-way in which the sewer extension is to be made shall be improved prior to preparation of construction plans and installation of the sewers. Permanent private easements shall be not less than ten feet (10') in width. Public rights-of-way shall be cleared, grubbed and graded in accordance with the requirements of appropriate road agency. Monuments disturbed or destroyed shall be replaced at the Developer's expense.
14. The pipe sizes, routing and alignment (including build-through) shall be selected as is indicated by good practice and shall conform to the Comprehensive Sewer System Plan, as approved by the District.

Manholes

15. Manhole numbers are obtained from the District Engineer.
16. All lines 8-inches and larger shall terminate in a manhole. All pipes entering/leaving a manhole shall be aligned with the center of the manhole unless otherwise authorized by District.
17. Manholes shall be precast, shall be 48" I.D. in accordance with the specifications and Detail Nos. 1, 2, and 2A and shall conform to ASTM C478. Manhole frames and covers shall be locking type in accordance with the specifications and Detail No. 3 and shall be supplied with stainless steel allen head cap screws. Ideally, manholes should be 7 feet plus in depth. Avoid manhole depths between 4 and 6 feet.

18. Manholes located in traffic areas shall have either a concrete or asphalt collar to hold neck assembly in place.
19. Where drop manhole is required, use outside drop unless otherwise authorized by the District. See Detail No. 5.
20. Manholes shall have a minimum one-tenth of a foot drop across the manhole (wall to wall). See Detail No. 7.
21. Manhole channels shall be shaped to allow placement and use of the Districts television inspection equipment. Approximate dimensions are 32" long x 6" diameter.
22. Manholes shall be placed at each grade and direction change. Distances between manholes shall not exceed 400 feet.
23. Terminal manholes where future connection/extension may occur shall not be channeled. A grouted bottom sloping to the outlet shall be constructed.

Side Sewer

24. Each building or lot to be served shall have its own side sewer extending from the sewer main. Indicate the lowest finished floor elevation of each building on drawing.
25. Approximate stub locations shall be shown on the plans.
26. Cleanouts shall be used.
27. Where commercial or multiple dwellings are to be constructed, stubs should be taken from the manhole. Multiple dwelling complexes shall have the number of units indicated. Commercial and industrial complexes shall have anticipated peak flows noted.
28. The grade for 6" side sewer stubs shall be a minimum of 2 percent (2%). The ends of the side sewers shall be marked with a vertical 1-1/4" white PVC pipe, ASTM 2241 SDR 21 200 PSI and shall rise 2 feet above finished grade level. Both ends of the PVC pipe shall have caps glued on and the pipe interior kept clean for the purpose of future depth measurement.
29. When an existing side sewer is to be reused after being disconnected or abandoned, the side sewer, the stub in the right of way, and the connection to the main shall be telespected (TV inspected) to determine the integrity and condition of the lines. If the District determines the side sewer, stub, or tee connection is/are deteriorated, structurally unsound, cracked, leaking, or shows other indications that the useful life of the side sewer, stub, or tee connection is/are short, the side sewer, stub, and/or tee shall be replaced at the property owner's expense.

Mainline

30. Ductile iron pipe and pipe anchors shall be specified for all slopes 20 percent and over.
31. Pipes shall have a 4-foot minimum cover.
32. All pipes 8-inch and over shall terminate at a manhole.
33. Where smaller diameter upstream pipe meets a larger diameter downstream pipe, the inverts at the manhole shall be determined by matching pipe crowns.
34. Where the new system is to be connected to the existing system there shall be the following notations on the plans, "Verify Invert Prior to Construction".
35. Design system so building first (lowest) floor elevation is at least one foot higher than rim of first manhole upstream from point of side sewer connection.

36. Unless otherwise called for by the District's Engineer in the specifications and plans, gravity sewers shall be PVC pipe. Ductile iron or concrete, may be required in certain applications.

Plastic-PVC	ASTM D3034-SDR 35 or F789
Ductile Iron (Polyethylene Encased)	AWWA C151
Concrete	ASTM C-14 Class 2
37. Pressure mains shall be ductile iron or PVC.
38. All joints for manholes, sewers or pressure mains shall be of the rubber gasket type.
39. Minimum grade for 8-inch mains shall be 0.5% and the minimum grade for end sewer mains that will not be extended shall be 0.75%, unless otherwise approved by the District's Engineer. Minimum grade and design criteria, unless District criteria is more stringent, shall be in accordance with "Criteria for Sewage Works Design, State of Washington, DOE"; however, minimum grades shall not be used without prior approval from the District's Engineer.

Pump Stations

40. Developments that may require a pump station to provide sewer service shall conform to the District Pump Policy; Resolution 05-06.

Oil/Grease Removal

41. Developments that include businesses, functions or activities that may discharge oily waste (sewer waste containing mineral or petroleum oil) to the District's Sewer System will be required to install, use and maintain an oil/water separator. Oil/water separators connected to the sewer must be approved by the District prior to installation.

The separators should be sized to either have a minimum 45-minute detention time within the separator or have an effective separation/treatment capacity of at least 600 gallons. In addition, a grit-interception baffle should be incorporated in the design. However, the capacity and configuration of the separator must be approved by the District prior to installation. Refer to District Resolution No. 05-06 for a complete listing of the District requirements concerning oil/water separators. Resolution No. 05-06 is available at the District Office.
42. Developments that include business, functions or activities that may discharge wastewater containing animal/vegetable fats, oils or greases to the District Sewer System will be required to install, use and maintain a grease separator. Grease separators connected to the sewer are to be installed outside of the business structure and shall only accept flows containing fats, oils and greases. Sanitary sewer flows from lavatories, etc. should exit the facility through a different line and connect with the grease interceptor effluent flow line. Each grease interceptor should serve one establishment and should be sized per the manufacturers specifications or in accordance with the Uniform Plumbing Code. However, the capacity and configuration of the separator must be approved by the District prior to installation. Refer to District Resolution No. 05-06 for a complete listing of the District requirements concerning grease separators. Resolution No. 05-06 is available at the District Office.

Submittal

43. The Developer shall submit 3 sets of plans for review by the District. When the plans have been determined to meet the District standards, then a final set of reproducible plans shall be submitted to the District. These reproducible plans shall receive the District "Plan Review" approval stamp. The District shall submit the plans to the regulatory agencies for approval. After approvals have been received, a set of plans stamped "Issued for Construction" shall be made available to the Developer.

Drafting Standards

44. Enclosed is a sample plan showing a typical sewer design (see page 26). Drafting of plans for the District shall conform to this example. As-built drawings shall be supplied to the District on mylar and electronic CAD file.

District Records

45. The District and its consultants do not insure the correctness of the information supplied to the Developer from the District records. The Developer shall verify by survey any information provided by the District prior to using the information in design or construction.

EASEMENTS

Legal descriptions for easements for all portions of the sewer which lie outside of public street right-of-ways shall be signed and stamped by a Professional Land Surveyor, currently registered in the State of Washington, and transmitted to the District. The easement shall be a minimum of 10 feet in width, with the sewer in the center. There shall be a separate easement provided for each lot that a sewer crosses. These easements are required by the District regardless of easements recorded with property deeds or plats.

Easements must be approved by the District prior to side sewer connection.

CONSTRUCTION RECORD MODIFICATION OF PLANS "AS BUILT"

When the Contractor completes the mainline sewer work and the manholes have been adjusted to the finish grade, the mylars and CAD files of the sewer plans shall be revised to conform with construction records, and then sent to the District. Prior to submitting revised plans, manhole inverts and horizontal alignment shall be verified by a Professional Land Surveyor, currently licensed in the State of Washington.

CONSTRUCTION INFORMATION

Developer shall make himself familiar with the enclosed Developer Project Manual. A Developer who has not made himself familiar with the manual has most commonly had problems in the following areas; this listing is not a substitute for reading and implementing the requirements of the Developer Project Manual.

1. Connection to Existing Line - Connections shall be made in a way that debris and water from the construction site is kept from entering the existing system. See Sections 02605 and 02730 of Specifications. If a manhole is constructed over an existing line, the existing line shall not be broken without District authorization.
2. Isolate Existing System - The existing system shall be protected using an isolation device (usually a mechanical plug). The isolation device shall be in place and inspected by the District prior to construction. The device shall remain in place and functional during construction. It shall not be removed until authorized by the District. If the above stipulations are not adhered to, the Developer will forfeit the \$1,000.00 system isolation deposit and the plug shall be reinstalled.
3. Cut Sheet - Cut sheets shall be given to the inspector two working days in advance of construction for the purpose of checking. All cut sheets used on the job site shall be issued through the District inspector. Line and grade shall be checked at each hub. Cut sheets shall show cuts at the first 25 and 50 foot station out of the downstream manhole, then every 50 feet thereafter.
4. Notice to Inspector - The inspector shall be notified 2 working days in advance of construction. Where work is to be done on the weekend or during evening hours the inspector shall be notified in advance of such work.
5. Manholes - Joints between precast manhole section shall be gasketed. Safety steps shall be used. Manhole covers shall be as specified. All pipes entering/leaving manholes shall be aligned with the center of the manhole unless otherwise authorized by the District. Manhole channels shall be shaped to allow placement and use of the District television inspection equipment. Manhole covers shall be locking type.

6. PVC Pipe - Bedding material shall be pea gravel with sand content. Exact bedding material description is noted in Section 02222.2.2 of the Specifications. PVC pipe shall have a mandrel passed through it to check for any deflections in the pipe at the end of the project. The Contractor shall supply the mandrel and the District shall approve the mandrel and witness the test.
7. Side Sewers - 6 x 6 inch tees or wyes and clean out shall be installed at the end of each side sewer (See Standard Detail 8). Maximum slope for side sewers is 2-foot vertical to 1-foot horizontal and a minimum slope is 2 percent. Side sewer locations shall be marked with a 1-1/4" PVC pipe capped on both ends. No side sewer shall be covered without being inspected. Where the service is to be provided to individual lots property corners shall be staked.

GENERAL NOTES

1. **ALL CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF THE RONALD WASTEWATER DISTRICT WHICH ARE CONTAINED IN A BOUND VOLUME ENTITLED, "DEVELOPER PROJECT MANUAL."**
2. **THE DISTRICT SHALL BE NOTIFIED 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL TESTING AND CONSTRUCTION SHALL BE INSPECTED BY RONALD WASTEWATER DISTRICT.**
3. **ALL SIDE SEWERS SHALL BE 6" DIAMETER PIPE CONSTRUCTED AT A MINIMUM SLOPE OF 2.00%, UNLESS OTHERWISE NOTED.**
4. **ALL SIDE SEWER STUBS SHALL EXTEND TO THE PROPERTY LINE AND THE ENDS MARKED AS DESCRIBED IN SECTION 02730, PARAGRAPH 3.5 OF THE SPECIFICATIONS.**
5. **LOCATIONS SHOWN FOR EXISTING UTILITIES ARE APPROXIMATE. IDENTIFICATION, LOCATION, MARKING AND RESPONSIBILITY FOR UNDERGROUND FACILITIES OR UTILITIES IS GOVERNED BY THE PROVISIONS OF CHAPTER 19.122, REVISED CODE OF WASHINGTON. SEE SECTION 02760 OF SPECIFICATIONS.**
6. **10 FOOT EASEMENTS: 5 FEET EACH SIDE OF SANITARY SEWER LINE AND/OR APPURTENANCES TO BE FURNISHED BY THE DEVELOPER WHEN THE SEWERS ARE LOCATED ON OTHER THAN PUBLIC RIGHT-OF-WAYS.**

7. **PLAN AND PROFILE INFORMATION AS FURNISHED BY THE DEVELOPER OR HIS ENGINEER.**
8. **MINIMUM SEPARATION OF POTABLE WATER MAINS AND SANITARY SEWER LINES SHALL BE IN ACCORDANCE WITH SECTION C1-9.1 OF THE "CRITERIA FOR SEWAGE WORKS DESIGN" PUBLISHED BY THE WASHINGTON STATE DEPARTMENT OF ECOLOGY AS REVISED OCTOBER 2006.**
9. **A PLUG SHALL BE PLACED IN THE OUTLET PIPE OF THE EXISTING MANHOLE WHICH IS TO BE CONNECTED TO OR THE OUTLET PIPE OF THE FIRST NEW MANHOLE CONSTRUCTED. A TIGHTLINE BYPASS MAY BE REQUIRED IN PLACE OF THE PLUG. THIS PLUG OR BYPASS SHALL REMAIN IN PLACE AND MAY NOT BE REMOVED WITHOUT THE PERMISSION OF THE RONALD WASTEWATER DISTRICT. REMOVAL WILL RESULT IN FORFEITURE OF SYSTEM ISOLATION DEPOSIT.**
10. **ALL PIPES ENTERING/LEAVING MANHOLES SHALL BE ALIGNED WITH THE CENTER OF THE MANHOLE. MANHOLE CHANNELS SHALL BE SHAPED TO ALLOW PLACEMENT AND USE OF THE DISTRICT'S TELEVISION INSPECTION EQUIPMENT.**
11. **THE DEVELOPER SHALL BE RESPONSIBLE FOR ACQUIRING ALL NECESSARY EASEMENTS AND AGREEMENTS PRIOR TO CONSTRUCTION.**

NOTICE:

CAUTION -- EXTREME HAZARD -- OVERHEAD ELECTRICAL SERVICE LINES ARE GENERALLY NOT SHOWN ON THE DRAWINGS. ELECTRICAL LINES SHOWN ON THE DRAWINGS ARE LOCATED BY POINT-TO-POINT, POWER-POLE-TO-POWER-POLE CONNECTION. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXTENT OF ANY HAZARD CREATED BY OVERHEAD ELECTRICAL POWER IN ALL AREAS AND SHALL FOLLOW PROCEDURES DURING CONSTRUCTION AS REQUIRED BY LAW AND REGULATION. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL MEET WITH UTILITY OWNERS AND DETERMINE THE EXTENT OF HAZARD AND REMEDIAL MEASURES AND SHALL TAKE WHATEVER PRECAUTIONS MAY BE REQUIRED. SEE SECTION 02760 OF SPECIFICATIONS.



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Name and Address of Agent	CONTACT NAME:	
	PHONE (A/C, No. Ext):	FAX (A/C, No):
INSURED Name and Address of Contractor	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	
	INSURER A : Insurance Carrier #1	
	INSURER B : Insurance Carrier #2	
	INSURER C :	
	INSURER D :	
INSURER E :		
INSURER F :		

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	GENERAL LIABILITY			XXXXXXXXXX	00/00/0000	00/00/0000	EACH OCCURRENCE \$ 1,000,000
	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 50,000
	<input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR						MED EXP (Any one person) \$ 5,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						PERSONAL & ADV INJURY \$ 1,000,000
	<input type="checkbox"/> POLICY <input type="checkbox"/> PROJECT <input type="checkbox"/> LOC						GENERAL AGGREGATE \$ 1,000,000
A	AUTOMOBILE LIABILITY			XXXXXXXXXX	00/00/0000	00/00/0000	PRODUCTS - COMP/OP AGG \$ 1,000,000
	<input checked="" type="checkbox"/> ANY AUTO						COMBINED SINGLE LIMIT (Per accident) \$ 1,000,000
	<input type="checkbox"/> ALL OWNED AUTOS	<input type="checkbox"/> SCHEDULED AUTOS					BODILY INJURY (Per person) \$
	<input type="checkbox"/> HIRED AUTOS	<input type="checkbox"/> NON-OWNED AUTOS					BODILY INJURY (Per accident) \$
A	<input checked="" type="checkbox"/> UMBRELLA LIAB			XXXX-XXXX	00/00/0000	00/00/0000	PROPERTY DAMAGE (Per accident) \$
	<input type="checkbox"/> EXCESS LIAB	<input type="checkbox"/> OCCUR					EACH OCCURRENCE \$ 2,000,000
	<input type="checkbox"/> CLAIMS-MADE						AGGREGATE \$ 2,000,000
	DED \$	RETENTION \$					
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY			XXXXXXXXXX or L & I Acct. #	00/00/0000	00/00/0000	<input checked="" type="checkbox"/> WC STATUTORY LIMITS
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)	Y/N	N/A				E.L. EACH ACCIDENT \$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE \$
							E.L. DISEASE - POLICY LIMIT \$
B	Other Asbestos			XXXXXXXXXX	00/00/0000	00/00/0000	\$ #####

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, if additional Remarks Schedule, if more space is required)

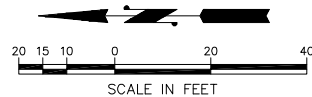
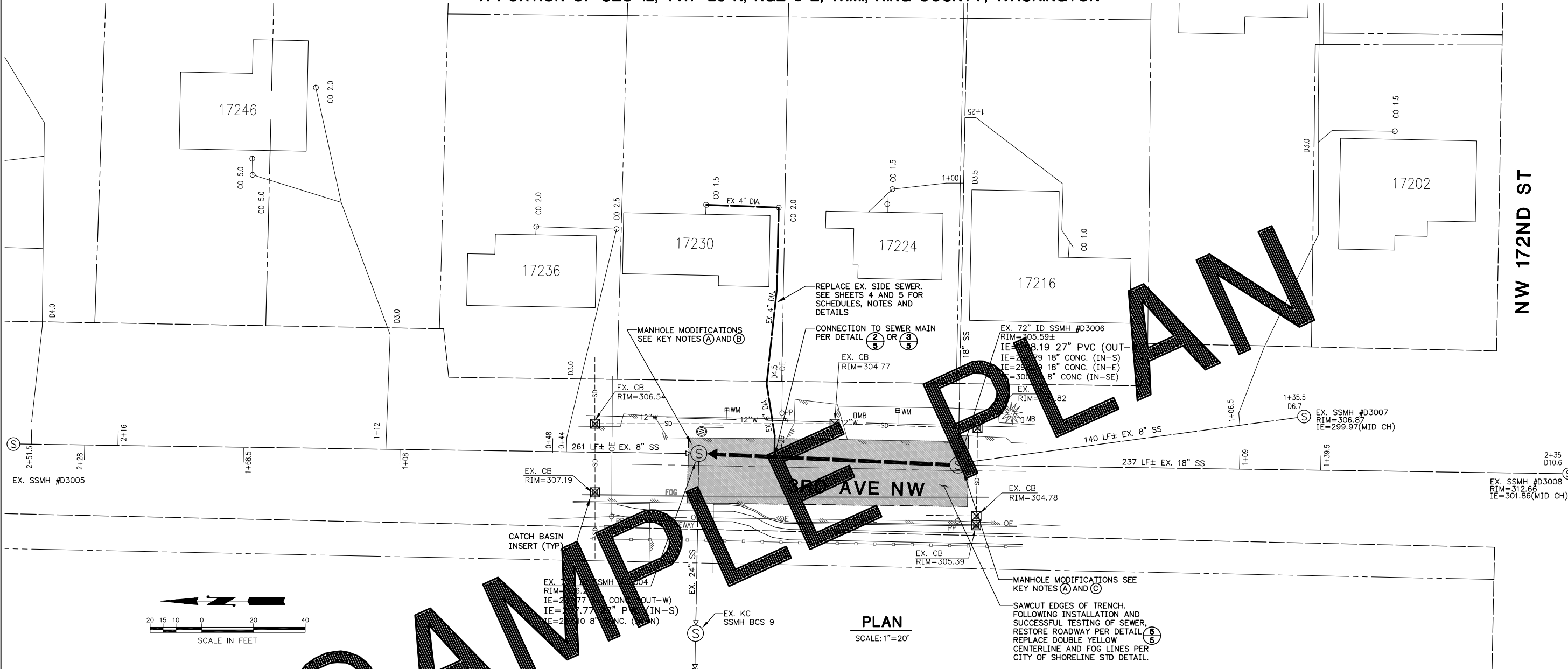
Owner and Consulting Engineer are named as "insureds" as respects work done on their behalf by the named insured, per attached endorsement.

CERTIFICATE HOLDER

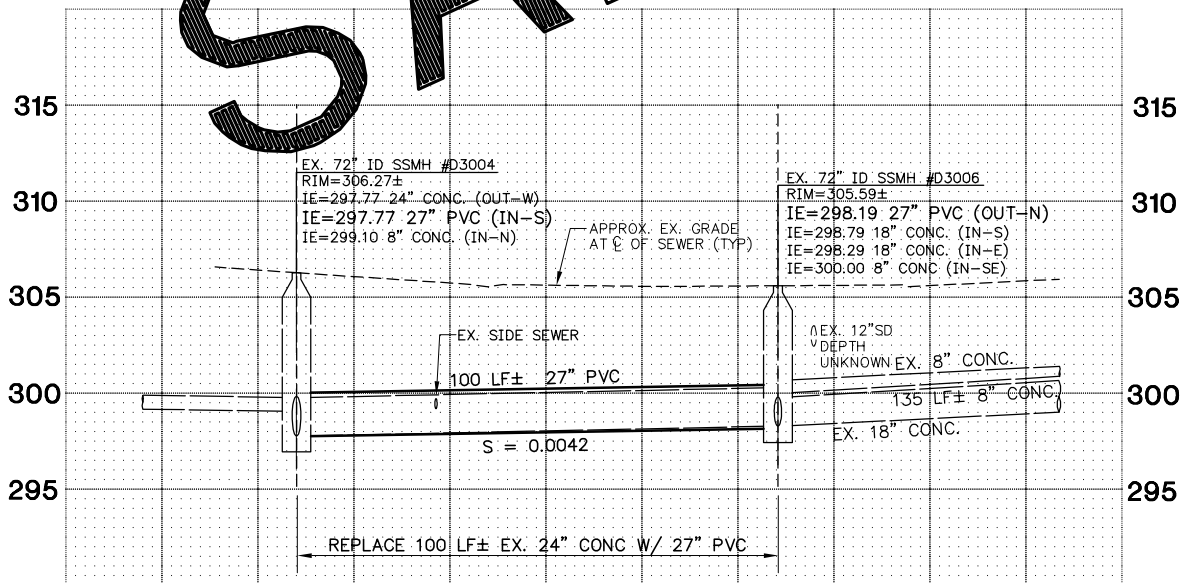
CANCELLATION

Owner	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE Signature

A PORTION OF SEC 12, TWP 26 N, RGE 3 E, W.M., KING COUNTY, WASHINGTON



PLAN
SCALE: 1"=20'



PROFILE
SCALE: HORIZ. 1"=20'
VERT. 1"=5'

MANHOLE MODIFICATION KEY NOTES:

- (A) VERIFY INVERT ELEVATION PRIOR TO CONSTRUCTION. CONNECT PVC PIPE TO MANHOLE USING SAND COLLAR (OR APPROVED EQUAL). RECHANNEL MANHOLE AS NECESSARY TO PROVIDE FOR SMOOTH HYDRAULIC FLOW TRANSITION ACROSS MANHOLE. SEAL CONNECTION TO MANHOLE WATER TIGHT.
- (B) EX. SSMH D3004: REMOVE EX. FRAME AND COVER. ADJUSTMENT RINGS AND TOP SLAB. ADD 2 FOOT HIGH, 72" DIA. BARREL SECTION AND SEAL PER DETAIL (1/5). REPLACE TOP SLAB, ADJUSTMENT RINGS, STEPS, LADDER AND FRAME AND COVER PER DISTRICT STANDARD DETAILS.
- (C) EX. SSMH D3006: REMOVE EX. FRAME AND COVER. ADJUSTMENT RINGS AND TOP SLAB. ADD 1 FOOT HIGH, 72" DIA. BARREL SECTION AND SEAL PER DETAIL (1/5). REPLACE TOP SLAB, ADJUSTMENT RINGS, STEPS, LADDER AND FRAME AND COVER PER DISTRICT STANDARD DETAILS.

CALL 2 BUSINESS
DAYS BEFORE
YOU DIG
1-800-424-5555

Approved by: _____ DATE _____
RONALD WASTEWATER DISTRICT

211010 - CARLYLE HALL ROAD DESIGN.dwg 1:1 2/23/24 12-10-13	
CHS ENGINEERS, LLC 12507 BEL-RED ROAD SUITE 101 BELLEVUE, WA 98005-2500 TEL (425) 637-3693 - FAX (425) 637-3694 www.chsengineers.com	
Drawn / Date JC/DJ 12/13	Designed / Date DF 12/13
Checked / Date SC 12/13	Revision
RONALD WASTEWATER DISTRICT	
CARLYLE HALL ROAD SANITARY SEWER IMPROVEMENTS SEWER PLAN AND PROFILE 3RD AVE NW	
Scale: Horiz. 1"=20' Vert. 1"=5'	Sheet 2 Of 6
Job No. 211010	13-C

SECTION D:

CONTRACT FOR DEVELOPER EXTENSION

**CONTRACT
PERFORMANCE AND PAYMENT BOND
CONVEYANCE OF SEWER FACILITY
CERTIFICATION OF COSTS AND CONSTRUCTION
RELEASE OF ENCUMBRANCE
11-MONTH INSPECTION FORM**

**CONTRACT FOR DEVELOPER EXTENSION
RONALD WASTEWATER DISTRICT**

REAL PROPERTY AND DEVELOPER'S WARRANTY OF TITLE AND AUTHORITY

Ronald Wastewater District, the "District" and

"Developer," enter into the following agreement, the "Contract," and make the following promises and covenants in consideration of the District providing a sewer connection to the proposed Developer Extension.

Developer warrants and represents that it owns the real property described below and is authorized to execute this Contract affecting it. Developer shall supply the District with a current title report issued by a title insurance company doing business in King County, Washington, approved by the District to evidence Owner's title to "The Property."

Developer desires to construct the proposed Developer Extension pursuant to the terms and conditions of this Contract. Upon completion of the Developer Extension, Developer agrees to convey, and transfer the improvements built "The Sanitary Sewer System" to the District under the terms and conditions of this Contract.

The proposed Developer Extension of the sanitary sewers will be installed in easements and/or in other approved rights-of-way and shall be for the use and benefit of the Property legally described as follows:

The parties, in consideration of the following mutual covenants and promises, agree as follows:

**I.
DISTRICT**

The District or its agent agrees to:

(a) Periodically inspect the Developer Extension, while under construction, to verify that it complies with the design standards and construction specifications of the District; and conforms to the present rules, regulations and resolutions of the District, and to the terms of this Contract. Such inspection shall in no way relieve Developer of its responsibility for compliance with the terms of the Contract and Developer Project Manual as well as the rules and regulations imposed by the County or other agencies.

(b) Allow developer to make the connection to the District's sewer system upon the completion of the Developer Extension, and upon Developer's fulfillment of the terms and conditions of this Contract, and when Developer has delivered to the District a Bill of Sale (Conveyance of Sewer Facility), Certification of Costs, and obtained the necessary permits and easements, including a Noise Easement, if required by the District, and when the Developer Extension has been approved by the District's consultants and accepted by the Board of Commissioners. The District's acceptance shall be formalized by a resolution passed by the Board of Commissioners authorizing the District to permit the connection of the Developer Extension to the District's sewer system.

Provided, however, connection of the Developer Extension to the District's system shall not relieve Developer of its obligation to correct defects in labor and/or materials, and/or any obligations, as provided for in this Contract. The connection of the Developer Extension, when authorized by the District's Board of Commissioners, shall cause the Developer Extension to be subject to the control, use and operation of the District and it shall be subject to all the District's rules, regulations and conditions of service.

II. DEVELOPER

(a) In the administration, design and construction of the Developer Extension, Developer shall comply with the District's Developer Project Manual, and all other related standards which are by reference to it and to Resolution 07-XX, as it has or may be amended, part of the District's Rules and Regulations.

(b) Developer agrees to comply with all environmental requirements, including Noise Pollution, as prescribed, either by the District or by any other Federal or State Regulations at its sole expenses, and Developer shall prepare an environmental checklist and/or an environmental impact statement, if directed by applicable lead agencies, all as required in the State Environmental Policy Act (SEPA), the District's SEPA Resolution 01-37 and all applicable administrative regulations and laws of the State of Washington, as now in effect and as they may be amended in the future.

Developer shall, prior to the execution of this Contract, provide the District with all documents to be filed under the Washington State SEPA statutes, including, but not limited to: i) Environmental Impact Statements (EIS), ii) Environmental Checklist, iii) the name of the lead agency, and iv) proof of Owner's compliance with all appropriate SEPA regulations.

For Developer Extensions outside of the District's boundaries, but within the area of its comprehensive plan, the District shall apply for necessary approval of a boundary adjustment by the Boundary Review Board and other agencies with jurisdiction. Developer shall be responsible for all costs incurred by the District in obtaining such approvals.

(c) Developer shall pay the District the sums listed below, at the times specified. In the event of Developer's default in paying the sums specified, all further performance by the District under this Contract is excused and the District shall have a lien against the property described in this Contract pursuant to RCW 56.08.010 and RCW 56.16.100 to secure Developer's payment of the sums listed in paragraph (c)(4) and any other sums due the District to reimburse the District for expenses incurred in connection with this Contract.

Developer agrees that in the event of Developer's default in making any payment specified, in addition to the sums listed in paragraph (c)(4), the District shall be compensated for all costs incurred in connection with the District's performance under and enforcement of this Contract, including but not limited to, consultant's fees, attorneys' fees, court costs, administrative expenses, inspection fees, filing fees and application fees, postage and copy charges, and labor and materials.

(1) Developer shall upon execution of this Contract deposit with the District the sum of \$ _____ (Project Deposit) to cover the estimated cost of design or design review, consultation, inspection, legal and other allied fees related to this project.

(2) Developer shall be responsible to reimburse the District for all administrative costs, legal expenses and costs incurred in annexation of the project area, in obtaining Boundary Review Board approval, in amending the District's Comprehensive Plan, and in negotiating with Developer for this Contract, if any of the foregoing occur.

(3) At the project end and before acceptance, the District will reconcile the District's actual expenses including an administration fee of 15%. In the event the District's actual expenses shall exceed the amounts stated or estimated in paragraphs (c)(1) and (c)(2), Developer shall pay the District the amount by which the District's actual expenses exceed the sums stated prior to the District accepting conveyance of the system. In the event the sums stated in paragraphs (c)(1) and (c)(2) are greater than

the District's actual expenses, the District shall refund to Developer the excess upon acceptance and conveyance of the system. If it appears that the deposit is inadequate and the project is not near completion, Developer shall pay to and deposit with the District additional funds as required by the District upon written request.

(4) Connection Charge - Developer shall, upon execution of this contract or upon approval of the design of project, whichever shall occur sooner, but in all events prior to commencement of construction, pay the District a connection charge of \$_____ comprised of the General Facilities Charge for each residential customer equivalent (RCE) to be located on said parcel or tract as defined in Resolution 06-29 and any amendments thereto and/or a front footage charge. The connection charge shall also include any local facilities charge due for this property.

The General Facilities Resolution is amended annually. Should the General Facilities Charge be increased prior to actual connection to the District's system and commencement of monthly sewer service payments to the District, the property owner at the time of connection to the system shall be subject to the increased General Facilities Charge and shall pay the difference to the District prior to the District providing service.

(d) The District's consultants shall prepare or review the plan for the Developer Extension to confirm compliance with the King County DNR Wastewater Treatment Division, State of Washington, Department of Ecology's Criteria for Sewage Works Design and applicable District standards. All information for preparation or review of the design is to be supplied by Developer at Developer's cost.

(e) Developer shall, prior to Construction, deposit with the District a guarantee deposit of \$ 2000.00 or 10 percent of estimated cost of construction as calculated by the District Engineer, whichever is greater. The Guarantee Deposit will be held by the District for a one-year warranty period following completion of the project and until final inspection and approval of the completed Developer Extension project by the District. The District may at any time during the one year following acceptance use any part or all of the Guarantee Deposit to reimburse the District for expenses incurred for breach of warranty or guarantee or for damage to property of the District or any other person or entity. This Deposit is not the District's exclusive remedy for Developer's breach of this paragraph or any provision of this Contract. This deposit shall:

(1) Ensure strict compliance with the District's standards, specifications and conditions;

(2) Reimburse the District for any damage to its existing system or the proposed Developer Extension as a result of Developer's failure to properly perform under this Contract;

(3) Reimburse the District for any and all necessary repairs to the system or restoration of other properties if the Developer does not, within 10 working days after written notice from the District of the need for repairs, make such repairs.

(f) Developer shall, prior to start of construction, deposit with the District a sum of \$1,000.00, the System Isolation Deposit to be held by the District until acceptance of the developer extension by the District. The \$1,000.00 deposit shall be forfeited if the system isolation is removed without authorization of the District.

III. COMMENCEMENT OF CONSTRUCTION

Developer estimates that if all required approvals are received in a timely manner, construction shall commence in approximately the _____ month of 20____. It is estimated that the project will be completed by the _____ month of 20____. If construction is not completed within the proposed completion date, the terms established by the District shall be subject to renegotiation.

If Developer determines that the project will not proceed, Developer shall be responsible for all costs incurred by the District in accordance with the terms of this Contract.

The Developer shall be responsible for project management and coordination. Project management includes, but is not limited to, overall project coordination, utility and road location, elevations and resolution of any conflicts between them.

IV. PLAN

(a) Prior to the District ordering its engineers to prepare or review the plans, Developer will submit to the District two (2) copies of the following design information. This information shall be submitted to the District within thirty (30) days following the execution of this Contract.

(1) The final or proposed final plat;

(2) Contour map with a maximum scale of 1"-100' and contour intervals of five (5) feet or less;

(3) A description and the elevation of bench mark data used on the project which shall conform to the District's (King County datum).

(b) Upon execution of this Contract and receipt of all the design information and the required deposit from Developer, the District will order its engineers to prepare or review the plans for the Developer Extension.

(c) If the plan is not accepted by Developer, or Developer does not desire to continue with the Developer Extension, any fees paid by the Developer and not expended by the District shall be refunded to the Developer together with any remaining security deposits.

(d) Following acceptance of the plan by Developer and the District, and approvals by appropriate agencies, and upon receipt by the District of a Certificate of Insurance (complying with the insurance required as set forth by the Contract), execution and submittal of a performance bond, if required, and all required permits, and a pre-construction conference covering and demonstrating compliance with all items on the "Developer Extension Checklist," Developer may, five (5) days thereafter, begin construction only if satisfactory arrangements have been made for scheduling inspectors from the District's engineering firm.

(e) Developer agrees that there shall be no sewage flow through any mains or facilities constructed by Developer prior to the acceptance of the Developer Extension by the District.

(f) Developer shall create all roads to the design subgrade elevation prior to the start of construction and shall advise the District in writing of any changes which may be contemplated during construction. No changes of the subgrade elevations of roads where sewers are installed will be allowed without review and approval by the District. Developer shall be responsible for all costs incurred as a result of any change in subgrade elevation. This obligation shall remain in full force until the appropriate municipality, releases the right-of-way or road construction bond, or any

other bond, in connection with Developer's obligation for completion of the road within the area.

(h) If gravity service is not available and a pump facility is required, Developer shall comply with Ronald Wastewater District Resolution 01-37, as amended, and in particular those provisions contained in Section 10.05 of Resolution 01-37 which specifically relates to the Ronald Wastewater District policy on pump stations constructed under a Developer Extension Agreement.

V. ADDITIONAL FEES

An additional fee in an amount required to fully reimburse the District and cover the District's expenses shall be paid to the District by the Developer for the following additional work, if performed;

(a) Revisions of the Contract plans and specifications, and work occasioned by an act of Developer relating thereto.

(b) Additional inspections (county, state, other).

(c) Reinspection of deficient work.

(d) Any permit or franchise acquired by the District.

(e) Acts by Developer requiring the District's Manager, staff or consultants to spend extraordinary time on the Developer Extension. These fees shall be based on the actual time expended by the District staff based upon the District Resolution establishing rates for District staff then in effect, or its consultants and shall be paid by Developer upon receipt of an invoice from the District. Payment shall be a prerequisite to obtaining connection of the Developer Extension and sewer service into the District's system.

VI. EVIDENCE OF INSURANCE

(a) Developer and Developer's contractor shall assume responsibility for securing and maintaining, during the life of this Contract, public liability insurance for bodily injury and property damage liability including, without limitation, coverage for explosion, blasting, collapse and destruction of underground utilities (X.C.U.), and contingent liability, including product and contemplated operations and blanket contractual liability, which insurance shall protect Developer, the District and the District's engineers in the amounts specified in Sections (b)(1) and (b)(2) below and as specified in Section 00700-15 of the Developer Project Manual. Coverage shall also be obtained for environmental damage during the construction and the guarantee period, unless the District waives this coverage on account of Developer's inability to purchase same. Developer or contractor shall have the District and District engineers specifically added as additional named insurers in said policies, all at no cost to the District or District engineers. The above insurance shall cover the District, District engineers, Developer and subcontractors for claims or damages of any nature whatever, including, but not limited to, bodily injury, including wrongful death, as well as other claims for property damage which may arise from operations under this Contract, whether such operations be performed by themselves or by any subcontractor or anyone directly or indirectly employed by either of them, and Developer agrees, in addition, to indemnify and save harmless the District and District engineers, or both, from all suits, claims, demands, judgments and attorney's fees, expenses or losses occasioned by the performance of this Contract by Developer, any subcontractor or persons working directly or indirectly for Developer, or on account of or in consequence of any neglect by any of said parties in safeguarding the work or failure to conform with the safety

standards for construction work adopted by the Safety Division of the Department of Labor and Industries of the State of Washington.

(b) The minimum amount of such insurance shall be as follows:

(1) Bodily injury liability insurance in an amount not less than \$1,000,000.00 (One Million Dollars) for injuries, including accidental wrongful death, to any one person, and subject to the same limit for each person, in an amount not less than \$1,000,000.00 (One Million Dollars) on account of any one occurrence;

(2) Property damage liability insurance in an amount not less than \$1,000,000.00 (One Million Dollars) for each occurrence.

(c) Developer or contractor shall not cause any policy to be canceled or permitted to lapse, and all policies shall include a clause to the effect that the policy or certificate shall not be subject to cancellation, or to a reduction in the required limits of liability or amounts of insurance, or any other material change, until notice has been mailed to the District by certified mail, return receipt requested, stating when, not less than thirty (30) days thereafter, such cancellation or reduction or change shall be effective.

(d) All certificates of insurance, authenticated by the proper officers of the insurer, shall state in particular the names of those insured, the extent of the insurance, and the location, character or extent of the work to be performed by such contractor or subcontractor. Any determination of acceptance of lesser coverage shall rest solely with the District.

(e) Copies of all certificates of insurance shall be kept on file at the District office.

VII. INDEMNIFICATION

A. Developer will indemnify and save the District and/or the District's agents harmless from all claims and costs of defense thereof, including (by illustration but not limitation) attorneys' fees, expert witness fees and the cost of the services of engineering and other personnel whose time is reasonably devoted to the preparation and attendance at depositions, hearings, arbitration proceedings, settlement conference and trials, growing out of the demands of the contractor, other property owners or subcontractors, laborers, workmen, mechanics, material men or suppliers, incurred in the performance and work necessary to complete the Developer Extension. Developer shall, at the District's request, furnish satisfactory evidence that all obligations of any nature described in this Contract have been satisfied, discharged, paid and/or waived.

B. In the event the District has waived the requirement for insurance coverage for environmental damage during construction and during the guarantee period, Owner's indemnification agreement, as set forth above, shall extend to any and all claims, including claims, citations, fines, penalties or other enforcement actions by governmental agencies, arising from harm or damage to the environment during construction of Developer's project or during the guarantee period.

VIII. PERFORMANCE BOND

(a) It is contemplated that a portion of the Developer Extension will be constructed on rights-of-way obtained by the District under its franchise with the City of Shoreline and Snohomish County. It will be necessary for Developer and contractor to abide by all Washington State, Snohomish County, City of Shoreline and District regulations pertaining to work in the public rights-of-way.

(b) In accordance with the District regulations, all work done in public rights of way and to the District's sewer system will be done by a District licensed and bonded contractor. The amount of bond, license requirements, and fee is defined in the rules and regulations adopted by the District.

(c) In addition to the contractor's bond, Developer shall prior to construction furnish the District with a performance bond based upon the estimated cost of the construction which shall be estimated by the District's Engineer upon completion of the design. The performance bond shall be conditioned upon the performance by Developer of all undertakings, covenants, terms, conditions and agreements of the contract for Developer Extension and upon the prompt payment by Developer to all persons supplying labor and materials in the prosecution of the work provided by the Developer Extension and this contract. The bond shall be executed by Developer and a corporate bonding company authorized to transact such business in the State of Washington, which is acceptable to the District.

(d) The expense of the bond shall be borne by Developer and/or contractor. If at any time a surety on any such bond is declared a bankruptcy or loses its authority to do business in the State of Washington, Developer and/or contractor, shall substitute an acceptable bond (or bonds) in a form and sum as may be satisfactory to the District and be signed by such other surety or sureties.

IX. EASEMENTS

(a) All required easements outside of the project property shall be obtained by Developer prior to construction at no cost to the District.

(b) All easements required over the Developer's property shall be granted by the Developer to the District as part of the Developer's Conveyance of Sewer Facilities.

(c) If Developer constructs a Pump Station, noise and/or vibration easements in a form acceptable to the District shall be executed by Developer or by other interested parties prior to the District's acceptance of the Developer's conveyance of the sewer facility .

(d) All easements shall be prepared and recorded at Developer's sole cost and expense, and shall be delivered to the District after construction and prior to the District's acceptance of the Developer Extension, except as noted. Easements shall be drafted by the District engineers in conformity with the standard form approved by the District. A certified legal description shall be prepared by a licensed land surveyor and sent to the District engineers for their use in preparing the easements. If the legal descriptions are unacceptable, it shall be Developer's responsibility to supply the District engineers with corrected information. The District shall have the right to reject any easement which does not meet the requirements in form and contract required by the District.

(e) All easements shall be at least ten (10) feet in width, centered on the sewer lateral. No other lines, mains, services, buildings or appurtenances shall be permitted to encroach upon this ten (10) foot area.

(f) Violating structures of any kind shall be removed by Developer at no cost to the District.

X. PERMIT

A. Necessary permits from all governmental agencies which are required to be obtained by the District shall be at Developer's expense. Developer shall

be provided with a copy of all such permits before construction commences. Developer shall provide the District with documents necessary to obtain those permits.

B. Copies of any permits obtained by Developer shall be furnished to the District.

C. Developer and/or Contractor shall comply with all the regulations of all city, state, county, or other jurisdictions applicable to Developer and/or its Contractor while construction is in progress.

XI.

CONVEYANCE OF SEWER FACILITY

Developer agrees to execute a Conveyance of Sewer Facility in the form contained in the Developer Project Manual prepared by the District prior to the acceptance of the Developer Extension by the District. The Conveyance of Sewer Facility will provide for transfer of title to the improvement constructed by the Developer to the District and will include the following declarations;

(a) Developer is the lawful owner of the property and the property is free from all encumbrances.

(b) All bills for labor and material have been paid.

(c) Developer has the right to transfer the improvement, and Developer will warrant and defend the District against all claims and demands of all persons for one (1) year from the date of acceptance of the Conveyance of Sewer Facility by the District.

(d) It will recite that Developer conveys the Developer Extension to the District in consideration of incorporating it into the overall sewer system of the District.

(e) Developer warrants that for a period of one (1) year from the date of acceptance the sewer system will remain in good working order and in a condition acceptable to the District and that Developer will, at its own expense, repair or replace any work or material that may prove to be defective during the one (1) year period of warranty.

XII.

CERTIFICATION OF COSTS

Developer agrees to execute a Certification of Costs in the form contained in the Developer Project Manual to be submitted to the District with the Conveyance of Sewer Facility. The Certification will specify all costs of construction of the facility being conveyed to the District on forms approved by the District.

XIII.

LATECOMERS AGREEMENT

Preparation and execution of a Latecomers Agreement, if required, shall be in the form determined by, and be subject to, approval of the Board of Commissioners. The parties agree that any Latecomers Agreement will conform to the terms of the "Municipal Water and Sewer Facilities Act", RCW 35.91.010, et seq.

XIV.

DISTRICT ACCEPTANCE OF THE DEVELOPER EXTENSION

Prior to acceptance of the Developer Extension by the District, the Developer shall provide the District with the necessary permits, easements, conveyance of sewer facility, and certification of costs, and the District's engineers shall have approved the Developer Extension as inspected and completed.

Upon successful completion of all "acceptance requirements", acceptance of the facilities shall be authorized and approved by the District through a resolution

adopted by the District's Board of Commissioners at a regularly scheduled board meeting. No service into the District's system shall be made without the expressed consent of the District as evidenced by the resolution.

XV.

FINAL ACCEPTANCE BY DISTRICT OF DEVELOPER EXTENSION

For the one (1) year period following the passage of the District resolution authorizing the Developer Extension's acceptance, Developer shall warrant the workmanship and materials and equipment furnished by Developer, and Developer shall guarantee that all workmanship, materials and equipment will remain in normal working order and condition, except where abused or neglected by the District, and Developer shall repair or replace at its own expense any work or material that may prove to be defective during this guarantee period.

The District, one (1) year from the date of passage of the resolution authorizing acceptance of the Developer Extension, shall reinspect the system to determine if the Developer Extension has complied to the warranty of Developer and conforms to the District's standards and specifications. If the Developer Extension meets with the District's approval, then the District shall refund to Developer the remaining monies in the Guarantee Fund, if any.

XVI.

ATTORNEYS' FEES

In the event this Contract is referred to or placed in the hands of an attorney by either party for enforcement of any rights or obligations under this Contract, or if a lawsuit is instituted with respect to this Contract, the prevailing party shall be entitled to its reasonable attorneys' fees, costs and other allied expenses incurred in the action as part of any order or judgment entered, including those incurred upon an appeal.

XVII.

PETITION FOR ANNEXATION

If the property is not in the District or a ULID, Developer agrees to execute a petition for annexation of the area in which this Property is located and to not protest the formation of a ULID.

XVIII.

OBLIGATIONS OF SUCCESSORS

This Contract shall constitute an easement and servitude upon the property described in this Contract and shall be binding upon the heirs, assigns and successors in interest to Developer.

XIX.

ADDITIONAL TERMS

Additional stipulations may become a part of this Contract by mutual consent of the District and Developer and shall be covered by an appropriate exhibit to this Contract.

XX.

SURCHARGE ON MONTHLY SEWER SERVICE CHARGES

Pursuant to Section 12 of Resolution 07-07, as amended, the District, may upon connection of the Developer Extension system to the District's system, determine the classification of customer and may impose a surcharge per dwelling

unit/per month, in addition to the District charge due under Section 16 of Resolution 07-07, as amended, or due under any future comprehensive rate resolution adopted by the District. The surcharge is for those properties requiring pump stations or other facilities to be maintained by the District and shall be reviewed annually by the District in connection with the District's adoption of its annual budget. The District's rates and surcharges shall be adjusted to reflect actual costs during the preceding year and anticipated costs during the coming year. The District shall inform Developer of the amount of the surcharge for the following year by December of the previous year.

**XXI.
ASSIGNMENTS**

This Agreement and Developer's rights, duties, obligations and benefits arising under it shall not be assignable by Developer or by operation of law without the District's consent in writing having first been obtained. The District shall, subject to obtaining documentation of a successor's financial interest and technical ability to complete performance of Developer's obligations under this Contract, not unreasonably withhold such consent.

**XXII.
GOVERNING LAW**

This Agreement shall be interpreted, construed and enforced under the laws of the State of Washington. Any action brought to interpret, enforce or resolve any disputes under it shall be brought in the Superior Court of the State of Washington, in King County.

DATED _____, 20____

Developer

Developer

DATED _____, 20____

RONALD WASTEWATER DISTRICT,
a municipal corporation

By _____
President
Board of Commissioners

State of Washington)
)ss
County of King)

I certify that I know or have satisfactory evidence that

are
the persons who appeared before me, and they acknowledged signing this instrument and acknowledged it to be their free and voluntary acts for the uses and purposes mentioned in the instrument.

Dated this _____ day of _____, 20__.

State of Washington)
)ss
County of King)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, acknowledged signing this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the President of Ronald Wastewater District, a municipal corporation, as his free and voluntary act for the uses and purposes mentioned in the instrument.

Dated this _____ day of _____, 20__.

Notary Public in and for the State of Washington,
residing at _____
My appointment expires _____

PERFORMANCE AND PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, That we _____, the Contractor named in the Contract hereinafter referred to has PRINCIPAL, and _____ as SURETY, are held and firmly bound unto the State of Washington, and unto the **Ronald Wastewater District** hereinafter called the Owner named in said contract, _____ in the penal sum of _____ (\$_____), lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, assigns, administrators and successors jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that Whereas, the Principal entered into a contract with the Owner, dated _____ 20____ for work in connection with the Owner's _____ Project in _____ County of _____, State of Washington.

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform all of the provisions and fulfill all of the undertakings covenants, terms, conditions and agreements of said contract during the period of the original contract and any extensions thereof that may be granted by the Owner, with or without notices to the surety; and during the life of any guarantee required under the contract; and shall also well and truly perform and fulfill all of the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made; notice of which modifications to the surety being hereby waived; and furthermore shall pay all laborers, mechanics, and subcontractors and material men, and all persons who shall supply such person or persons and such principal or subcontractors with provisions and supplies for the carrying on of such work, shall indemnify and save harmless Owner from all costs and damage by reason of the principal's default of failure to do so, and shall pay the State of Washington sales and use taxes, and amounts due said state pursuant to Titles 50 and 51 of the revised Code of Washington then this obligation to be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the above bonded parties have executed this instrument under their separate seals this _____ day of _____, 20____, the name and corporate seal of each corporate party hereto affixed, and these presents duly signed by its undersigned representatives pursuant to authority of its governing body.

PRINCIPAL

TWO WITNESSES:

ATTEST: (If Corporation)

By: _____

Title: _____

Corporate Seal:

SURETY

By:_____

Title:_____

CERTIFICATES AS TO CORPORATE SEAL

I hereby certify that I am the (Assistant) Secretary of the Corporation named as Principal in the within Bond: that _____ who signed the said Bond on behalf of the Principal was _____ of said Corporation, that I know his signature thereto is genuine, and that said Bond was duly signed, sealed, and attested for and in behalf of said Corporation by authority of its governing body.

Secretary or Assistant Secretary

A copy of this bond shall be filed with the County Auditor.

CONVEYANCE OF SEWER FACILITY

FOR VALUABLE CONSIDERATION, receipt of which is hereby acknowledged, _____ hereby grants, bargains, sells and conveys to RONALD WASTEWATER DISTRICT, a municipal corporation, the following described property located in King County, Washington:

ALL of the Sewer System heretofore constructed to serve the Plat of _____ as recorded _____.

The Sewer System is more specifically described as follows:

Pipe Size	Approx Length	On	From	To
--------------	------------------	----	------	----

Including manholes, side sewers, tees, wyes and other appurtenances, all within public right-of-way and/or easements.

In making the conveyance, the undersigned warrants to the District that all claims for labor, material or taxes and other indebtedness that might be a lien against said Sewer System have been paid and further guarantees to the District for the period of one year from the date of this instrument, that the said sewer be free of defects in labor and material.

The undersigned further warrants to the District that he owns said Sewer System free and clear of all encumbrances and has full right, title and right to dispose of same.

The execution of this conveyance hereby ratifies the Developer Extension Agreement.

DATED this ____ day of _____, 20__.

_____	_____
_____	_____

STATE OF WASHINGTON	} ss
COUNTY OF KING	

On this day of _____, 20__, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared __ to me know to be the individuals described in and who executed the foregoing instrument and acknowledged to me that they signed and sealed the said instrument as a free and voluntary act and deed for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed the day and year in this certificate above written.

NOTARY PUBLIC in and for the
State of Washington, residing at

**CERTIFICATION OF COSTS OF CONSTRUCTION
OF DEVELOPER EXTENSION CONVEYED TO
RONALD WASTEWATER DISTRICT**

The undersigned is the Developer of the plat of _____ and has, pursuant to an agreement with Ronald Wastewater District dated the _____ day of _____, 20____, constructed certain sewer facilities which after connection to the sewer system of Ronald Wastewater District are to be conveyed to the District by the Developer.

In accordance with the terms of the said Developer Extension Agreement between the undersigned and Ronald Wastewater District, the undersigned hereby certifies that the costs of construction of the facility being conveyed to the District pursuant to said Developer Extension Agreement are as follows:

A.	Materials	\$ _____
B.	Labor	\$ _____
C.	Engineering	\$ _____
D.	Permits & Fees	\$ _____
E.	Other Costs	\$ _____
	_____	\$ _____
	_____	\$ _____
	_____	\$ _____

TOTAL COSTS OF CONSTRUCTION
OF FACILITY \$ _____

CERTIFIED TO RONALD WASTEWATER DISTRICT

BY _____
(insert name of developer if an individual or corporation if a corporate developer)

BY _____, President

Corporate Seal
(if required)

BY _____, Secretary

INDIVIDUAL ACKNOWLEDGEMENT:

STATE OF WASHINGTON)
)ss
COUNTY OF KING)

On this day, personally appeared before me _____, to me known to be the individual described in and who executed the within and foregoing instrument and acknowledged to me that he signed the same as his free and voluntary act and deed for the uses and purposes therein mentioned.

WITNESS my hand and official seal this ____ day of _____, 20__.

NOTARY PUBLIC in and for the State of Washington,
residing at _____

RELEASE OF ENCUMBRANCE

WITNESSETH:

Ronald Wastewater District, a Washington municipal corporation ("the District") and _____ ("the Developer") entered into an Agreement on the _____ day of _____, 20____, for construction of a sewerage collection system on property located adjacent to or in the District and in _____ County, legally described as:

SEE ATTACHED EXHIBIT "A"

and,

The Agreement was an Agreement of Restriction encumbering "the Property" (legally described above) and the Developer, and

Developer has now satisfactorily performed all of the terms and conditions of the Agreement, including payment of the charge in lieu of assessment (HUILOA) and/or general facilities charge, NOW, THEREFORE,

The District quit claims and releases unto the Developer any encumbrance held by the District against the Developer and the Property as legally described above, held by virtue of the Agreement recorded in the files of the King County Auditor, Recording No. _____.

RONALD WASTEWATER DISTRICT
King County, Washington

President and Commissioner

Secretary and Commissioner

State of Washington)
) ss.
County of King)

On this _____ day of _____, 20____, before me, the undersigned Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ and _____, to me known to be the President and the Secretary, respectively, of Ronald Wastewater District, the municipal corporation that executed the foregoing instrument, and acknowledged it to be the free and voluntary act and deed of said municipal corporation for the uses and purposes therein mentioned, and on oath stated that they were authorized to execute the said instrument by Ronald Wastewater District Resolution No. _____, dated _____, 20____, and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal affixed the day and year first above written.

Notary Public in and for the State _____
of Washington, residing at _____
My appointment expires _____

11 - MONTH INSPECTION

Final inspection report for:

1. Name of Development _____
2. Contractor _____
3. Developer _____
4. Date of Inspection _____
5. Inspector _____

INSPECTION CHECKLIST:

- a. Condition of Roadway: _____

- b. Condition of Sewer Main: _____

- c. Condition of Manholes: _____

- d. Any other utilities problems visible; water boxes, valve box, light poles, storm drains, etc.

- e. What conditions need to be corrected in order to approve project. Use additional page(s), if necessary:

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SECTION 00700 GENERAL CONDITIONS

1. DEFINITIONS

Wherever used in the Contract Documents, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof.

1.1 ADDENDA

Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the Contract Documents, Drawings and Specifications, by additions, deletions, clarifications or corrections.

1.2 APPROVAL OR APPROVED

To accept as satisfactory in concept, type, size and standard of quality.

1.3 BONDS

Bid, Performance and Payment Bonds and other instruments of security, furnished by the Contractor and his Surety in accordance with the Contract Documents.

1.4 CONTRACT OR THIS CONTRACT

The particular Contract executed by the Contractor and the Owner, of which these General Conditions are integral parts.

1.5 CONTRACT DOCUMENTS

All of the documents and information set forth in Article IV of the Agreement.

1.6 CONTRACT DRAWINGS OR DRAWINGS

The part of the Contract Documents which shows the characteristics and scope of the work to be performed and which have been prepared or reviewed by the Engineer.

1.7 CONTRACTOR'S EQUIPMENT

All items of materials or equipment remaining in the Contractor's ownership and removed from the site upon completion of the project.

1.8 CONTRACTOR

The developer or the developer's contractor or subcontractor employed by the developer to do any part of the work on the project, all of whom shall be considered agents of the developer.

1.9 DAY

In the Contract the term day shall mean a calendar day of 24 hours beginning at 12:00 midnight.

1.10 DEVELOPER

Property owner to be benefited by the proposed developer extension, including the developer's agents and contractor. A party to the Developer Extension Agreement.

1.11 DISTRICT

Ronald Wastewater District, a party to the Developer Extension Agreement normally called out as the Owner in the Developers Project Manual.

1.12 ENGINEER

The Consulting Engineer employed by the Owner, acting either directly or through his authorized assistants.

The owner has the right and authority to employ several engineering firms, engineers, inspectors and the like and assign to them various engineering or administrative duties, functions and responsibilities of the "Engineer" as that term is used in this Contract. In such case the Owner shall advise the Contractor at the pre-construction conference or thereafter in writing of those divisions or assignments of engineering or administrative duties, functions and responsibilities and the firms or persons designated to perform them, and the designee shall be the "Engineer" for contract purposes within the context of the designation.

1.13 EQUIPMENT

The machinery, accessories, appurtenances and manufactured articles to be furnished and/or installed under the Contract.

1.14 EQUIPMENT DATA

Manufacturer's catalog sheets, brochures, diagrams, schematic drawings, performance charts and other descriptive data for equipment to be furnished by the Contractor as required and provided in the Contract Documents.

- 1.15 **EQUIVALENT**
When applied to an alternate of any kind, the word "equivalent" shall mean the following: equal in force, amount, functional performance, appearance and like in significant import but not necessarily admitting to superposition or be like in detail.
- 1.16 **FURNISH AND PROVIDE**
All essentials to performance of the function implied by the named subject, article or material shall be supplied for use, and unless otherwise specifically excepted, the named article, subject or material is to be incorporated into the work in the proper place and sequence and in a manner to attain satisfactorily the results required.
- 1.17 **INSTALL**
To set up for use or service. However, the use of this word shall not be deemed to imply that the subject shall not be supplied by and at the sole expense of the Contractor.
- 1.18 **ITEM**
A convenient subdivision of work.
- 1.19 **LATEST REVISION (AMENDMENT, ISSUE, SPECIFICATION)**
Wherever this (these) phrase(s) is (are) used "Latest" shall refer to the revision (amendment, issue, specification) in effect on the date of signing of the Developer Extension Agreement.
- 1.20 **LAWS**
The laws of the place where the work is to be performed (Federal, State and Local).
- 1.21 **LINE AND GRADE**
Horizontal and vertical control for all work which shall be carried from the Contractor's professional surveyor's points in a manner established by the professional surveyor.
- 1.22 **MATERIAL OR MATERIALS**
Machinery, manufactured articles, materials of construction (fabricated or otherwise), and any other classes of material to be furnished in connection with the Contract.
- 1.23 **MODIFY (MODIFIED)**
To alter, that is to make changes, minor, major, or basic.
- 1.24 **NOTICE TO PROCEED**
Written communication issued by the Owner to the Contractor authorizing him to proceed with the work and establishing the date of commencement of the work.
- 1.25 **OWNER**
The entity that is a party to the "Developer Extension Agreement", otherwise defined as the District.
- 1.26 **PLANS**
All official drawings or reproductions of drawings made or to be made pertaining to the work provided for in the Contract, or to any structure connected therewith.
- 1.27 **POINTS**
All marks, bench marks, reference points, stakes, hubs, tacks, etc., established by the Contractor's professional surveyor for horizontal and vertical control of the work.
- 1.28 **PRODUCT**
This term shall include materials, systems and equipment.
- 1.29 **PROJECT**
The structure or improvement to be constructed in whole or in part through the performance of the Contract.
- 1.30 **PROJECT MANUAL**
The Project Manual is defined as the Developer's Project Manual and includes the general conditions of the Contract, the Specifications and other related information.
- 1.31 **RELATED REQUIREMENTS SPECIFIED ELSEWHERE AND RELATED WORK**
- 1.32 **SPECIFIED ELSEWHERE**
General terms. Items listed under these headings are for convenient cross reference but the items listed are not exclusive of other Contract requirements and in no way limit the specifications applicable.
- 1.33 **REQUIRE**
To call for as necessary and essential.

- 1.34 **REQUIREMENTS**
A necessity.
- 1.35 **RESIDENT PROJECT REPRESENTATIVE**
The authorized representative of the Owner who is assigned to the project site or any part thereof and is sometimes referred to as Resident Engineer or Inspector.
- 1.36 **SHOP DRAWINGS**
All shop details necessary for the fabrication and installation of structural steel, pipe, machinery, equipment, including schedules and bending diagrams of reinforcing steel, and other detailed drawings, to be furnished by the Contractor as required and provided in the Contract Documents.
- 1.37 **SIDE SEWER STUB**
The side sewer pipeline beginning at the main line sewer and extending to the vicinity of the property line if construction is on public property or to the margin of the permanent easement if construction is on private property.
- 1.38 **SPECIFICATIONS**
The prescribed directions, requirements, explanations, terms and provisions pertaining to the various features of the work to be done, or manner and method of performance contained in Division 1 through 16 of the Project Manual. They also include directions, requirements and explanations as set forth on the Plans.
- 1.39 **SPECIAL PROVISIONS**
This term, when used, shall refer to the section of the Specifications which describes special features of contract requirements. This section describes modifications of the Standard Specifications, General and Special Construction requirements, and all other special features to complete the description of the requirements of the Contract.
- 1.40 **SUBCONTRACTOR**
Any person, firm or corporation other than an employee of the Contractor, all of whom shall be considered agents of the Developer, supply for and under agreement, either with the Contractor, or any Subcontractor of the Contractor, labor or materials, or both, for this project in connection with this Contract.
- 1.41 **SUBSTANTIAL COMPLETION**
The date as certified by the Engineer when the construction of the project or a specified part thereof is sufficiently completed, so that the project or specified part can be utilized by the Owner for purposes for which it is intended.
- 1.42 **SUITABLE**
Qualified and in all respects adapted to the use and purpose specified.
- 1.43 **SUPPLEMENTARY CONDITIONS**
Modifications to General Conditions to meet requirements that may be imposed by applicable federal, state and local laws and regulations, and such other Contract conditions as are required for the project.
- 1.44 **SUPPLIER**
Any person or organization who supplies materials or equipment for the work, including that fabricated to a special design, but who does not perform labor at the site.
- 1.45 **SURETY**
Any firm or corporation executing a surety bond or bonds payable to the Owner, securing the performance of the Contract either in whole or in part.
- 1.46 **WORDS AND PHRASES**
Whenever the words, "as required", "as permitted", or words of like effect are used, it shall be understood that the requirements, or permission of the Owner or Engineer is intended. The words, "sufficient", "necessary", "proper", and the like shall mean sufficient, necessary, or proper in the judgment of the Owner and Engineer, except in reference to provisions for safety facilities where the judgment of the State Safety Inspectors or persons in similar authority (other than the Engineer or Owner) shall be intended.
- 1.47 **WORKING DAY**
The term "working day" shall mean any calendar day except Saturdays, Sundays, and legal holidays at the place of building.

1.48 **TIME LIMITS**

All time limits stated in the Contract Documents are of the essence of the Contract.

1.49 **WORK**

The work necessary to manufacture and deliver the machinery, equipment and material and/or the furnishing of all labor, tools, material, equipment, construction equipment, working drawings where required, and other necessities for the construction or erection of the structures, facilities or improvements shown and called for in the Contract Documents and the act of constructing or erecting said structures, facilities or improvements complete for the proposed developer extension.

It is specifically stipulated that the Drawings, Specifications, and other Contract Documents do not purport to control the method of performing the work, but only the requirements to the nature of the completed work, the Contractor assuming the entire responsibility for methods of performing and installing the work. Suggestions as to method included in the Contract Documents or given by the Engineer shall be deemed advisory only and the feasibility of such methods or the lack thereof shall not affect the Contractor's or Developer's liability under this Contract.

1.50 **WRITTEN NOTICE**

Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the project.

2. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

2.1 **SCOPE OF WORK**

The Contractor may be furnished additional instructions and detail drawings, by the Engineer as necessary to carry out the work required by the Contract Documents.

2.2 **ADDITIONAL DRAWINGS**

The additional drawings and instructions thus supplied will become a part of the Contract Documents. The Contractor shall carry out the work in accordance with the additional detail drawings and instructions.

2.3 **NOTICES TO THE CONTRACTOR**

Any notices or services, which it may be necessary to deliver to the Contractor in connection with this Contract may be sent to the Contractor by regular mail to the Contractor's address as recorded in the signed Contract Documents or, if such address is lacking, to such other address as the Owner may deem proper.

3. CORRELATION AND INTENT OF DOCUMENTS

3.1 **CONTRACT DOCUMENTS**

The Contract Documents are complementary and what is called for by any one shall be binding as if called for by all. The intention of the Documents is to include, unless otherwise specifically stated, all labor and materials, equipment, and transportation necessary for the proper execution of the work. It is the intent of this Contract and its Drawings and Specifications and other Contract Documents to specify and set forth a complete operating unit or system ready for use between the Contract limits. In determining the scope of work the Plans and Specifications and Contract Documents shall be considered in their entirety. Where items of the work are specified or shown in general terms or without complete detail it is intended that such item shall be a complete operating item regardless of whether or not every detail has been set forth in the Contract Documents and omission of such details shall not be construed to mean that they are to be omitted by the Contractor and the cost of such details shall be included in the prices bid and set forth in the proposal items.

3.2 **REFERENCE STANDARDS**

Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or law or regulation in effect at the time of Advertisement for Bids, (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the

duties and responsibilities of Owner, Contractor or Engineer, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to Engineer, or any of Engineer's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the work or any duty or authority to undertake responsibility contrary to the other provisions of this contract.

4. CONFORMITY TO DRAWINGS AND SPECIFICATIONS

4.1 CONTRACT DOCUMENTS

4.1.1. All work shall be done in strict conformity to the Drawings and Specifications and to the exact line and grades as fixed by field survey.

4.1.2. The Owner reserves the right to make reasonable changes in location of materials and equipment, if such is considered expedient for a better constructed and operable unit or system; considering, however, that such changes are made prior to any work done on said item to be changed. Such changes to be done at no additional cost to the Owner.

4.2 ALTERNATE DESIGNS INITIATED BY THE CONTRACTOR

4.2.1. In the event that the Contractor shall request, or submit, an alternate design, or designs for some portion of his work, the Engineer will consider such alternate designs with reasonable promptness. Such requests for either a design review of alternate plans submitted by the Contractor, or request for a redesign initiated by the Contractor, as set forth above shall be made in writing to the Engineer. When the Contractor submits plans for an alternate design they shall be in the form of reproducible drawings.

4.2.2. Provided that such proposed alternate designs, or requested redesigns appear reasonable and satisfactory to the Engineer, the Engineer will perform an engineering review of the proposed alternate design, or if requested by the Contractor the Engineer will perform an engineering redesign of the work to assure its compatibility within the framework of a complete operating unit, or system, ready for use between the Contract limits.

4.2.3. The cost of the engineering review of the proposed alternate, or the cost of an engineering redesign as requested by the Contractor will be charged to the Contractor by the Owner at the Engineer's currently established rate.

5. MATERIALS AND APPLIANCES

5.1 PROVISIONS

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and all other facilities necessary for the execution and completion of the work.

6. DOCUMENTS

6.1 FURNISHED BY THE CONTRACTOR

6.1.1. Contractor shall provide himself with Drawings and Project Manual.

6.1.2. Contractor shall provide himself with such documents as may be incorporated into the Contract by reference.

6.1.3. Contractor shall provide himself with such Government Specifications, American National Standards, State Standards and other such drawings, specifications or standards as may be referred to in the Project Manual or on the Drawings, which are by such reference incorporated into the Contract Documents as if set forth herein in full.

6.1.4. Contractor shall provide himself with access to such codes, local regulations and laws as may be required by law, regulation and/or the Contract.

6.2 FURNISHED BY THE OWNER

Unless otherwise shown in the Supplementary Conditions the Contractor will be furnished free of charge, five (5) copies of the Contract Drawings and five (5) copies of the Project Manual and will be furnished as many additional copies as he may require, at cost of reproduction and handling.

6.3 OWNERSHIP OF DRAWINGS

All Drawings and Specifications are to become the property of the Owner upon completion of the work, and shall be turned over to the Owner upon demand, and shall not be used for any other work.

7. STATUS OF THE ENGINEER

7.1 INSPECTION

7.1.1. The Engineer shall act as advisor and consultant to the Owner in engineering matters relating to the Contract. The Engineer shall have access to the site of the work and all work and material to observe the progress and quality of the executed work.

7.1.2. The Owner, through its duly authorized official, shall have the authority to stop the work whenever in his opinion such stoppage is necessary to insure the proper execution of the Contract, and any order by the Owner to stop work shall in no case relieve the Contractor from the obligations of his Contract.

7.2 INTENT OF DRAWINGS AND SPECIFICATIONS

To avoid any misunderstandings which might arise as to the import of anything contained in the Drawings and Specifications or as to any discrepancy, error, or omission therein, seeming or actual, the Engineer's decision as to the true intent and meaning, and correction thereof, shall be binding and final. All dimensions will be considered valid. In the event of omitted dimensions, work shall not be started until the necessary dimensions have been obtained from the Engineer in writing.

7.3 ENGINEER TO HAVE ACCESS

The Engineer shall at all times have access to all parts of the work and to the shops wherein the work is in preparation for the purpose of inspection, and the Contractor shall at all times maintain proper facilities and provide safe access for such inspection.

8. PAYMENT FOR QUALITY CONTROL

8.1 GENERAL

8.1.1. The Owner shall provide all inspection and testing services not required by the Contract Documents.

8.1.2. The Contractor shall provide at his expense the testing and inspection services required by the Contract Documents.

9. ROYALTIES AND PATENTS

9.1 PAYMENT AND USE

9.1.1. If the Drawings or Specifications require, as part of the completed work the installation of a patented appliance, device or article or the continued use after completion of the work of a patented process, for use of which any royalties or license fees are chargeable for such continued use, the Owner will pay such royalties or license fees from and after the completion date of the contract.

9.1.2. The Contractor shall pay all other royalties and license fees, and shall hold and save the Owner and its officers, agents or employees harmless from liability for violation of patent rights, including all costs and legal expenses, for, or on account of, any patented invention, process, article, or appliance manufactured for or used in the performance of the Contract, including its use by the Owner.

10. SURVEYS

10.1 STAKES AND MARKS TO BE PRESERVED

10.1.1. Survey work on the project shall be performed by a licensed professional land surveyor.

10.1.2. Elevations used in the design and construction of the project shall be based on the Datum used by the Owner.

11. PROTECTION OF WORK, PROPERTY AND PERSONS

11.1 SAFETY AND HEALTH REGULATIONS

11.1.1 In order to protect the lives and health of his employees under the Contract, the Contractor shall comply with all pertinent provisions of applicable laws and regulations as they pertain to health and safety standards; and with all state and local safety acts and regulations applicable to the work; and shall maintain an accurate record of all cases of death, occupational disease and injury arising out of and in the course of employment on work under the Contract.

- 11.1.2. The Contractor alone shall be responsible for safety, efficiency and adequacy of his plant, appliances and methods, and for any damage which may result therefrom.
- 11.1.3. The Contractor shall assume responsibility for and take all special precautions required to prevent injury to persons or property arising by virtue of the work contracted for.
- 11.1.4. The Contractor will indemnify and hold harmless the Owner and/or Engineer from any loss, damage, costs, charges or expenses whether to persons or property (including, but not by way of limitation, any costs, expenses or reasonable attorney's fees in the defense of any claims therefore) to which the Owner and/or the Engineer may have been put by reason of any act, actin, neglect, omission or default on the part of the Contractor, provided however as to any liability for damages arising out of bodily injury to persons or damage to property caused by or resulting from the concurrent negligence of the Owner and/or Engineer or their agents or employees and the Contractor or its agents and employees, this agreement is valid and enforceable only to the extent of the Contractor's negligence.
- 11.1.5 In case any suit shall be brought against the Owner and/or Engineer on account of any negligent act, acting, neglect, omission or default of the Contractor, the Contractor hereby covenants to assume the defense thereof and pay any and all costs, charges, reasonable attorney's fees and other expenses and the Contractor shall pay any and all judgments that may be incurred by or obtained against the Owner and/or Engineer, except any judgments for liability for damages arising out of bodily injury to persons or damage to property caused by or resulting from the concurrent negligence of the Owner and/or its Engineers and their agents or employees, and the Contractor and its/his agents or employees. The obligation of the Contractor shall be limited and enforceable only to the extent of the Contractor's negligence.

11.2 EMERGENCIES

In emergencies affecting the safety of persons or the work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Engineer or Owner, shall act to prevent threatened damage, injury or loss. He will give the Engineer prompt written notice of any significant changes in the work or deviations from the Contract Documents caused thereby, and such changes and deviations shall be noted in writing.

11.3 CARE AND PROTECTION OF WORK

11.3.1. The Contractor shall be responsible for all damages that occur as a result of his fault or negligence in connection with the prosecution of the Contract and shall be responsible for the proper care and protection of all materials delivered and work performed until completion, and final acceptance by the Owner.

11.3.2. The Contractor shall provide such heat, covering and enclosures as are necessary to protect all work and materials against damage by weather conditions.

12. SUPERVISION

The Contractor shall keep on his work during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Engineer. The Superintendent shall represent the Contractor in his absence and all directions given to him shall be binding as if given to the Contractor. The Contractor shall designate, in writing, who his superintendent is to be.

The Contractor shall give efficient supervision to the work, using his best skill and attention. He shall carefully study and compare all Drawings and Specifications and other instructions, and shall at once report to the Engineer any error, inconsistency, or omissions which he may discover.

13. WARRANTY OF TITLE

13.1 MATERIAL, SUPPLIES AND EQUIPMENT

No material, supplies, or equipment for the work under this Contract shall be purchased subject to any security transaction, chattel mortgage or under a

conditional sale or other agreement by which an interest therein or if any part thereof is retained by the seller or supplier or any other person. The Contractor warrants good title to all material, supplies and equipment installed or incorporated in the work and agrees upon completion of all work to deliver the premises together with all improvements and appurtenances constructed or placed thereon by him to the Owner free from any claims, liens, or charges and further agrees that neither he nor any person, firm or corporation furnishing any materials or labor for any work covered by this Contract shall have any right to a lien upon the premises or any improvement or any appurtenances thereon, provided that this shall not preclude the Contractor from installing metering devices and other equipment of utility companies or of municipalities, the title of which is commonly retained by the utility company or the city. In the event of the installation of any such metering devices or equipment, the Contractor shall advise the Owner as to the owner thereof. Nothing contained in this article, however, shall defeat or impair the right of such persons to look to funds due the Contractor in the hands of the Owner. The provisions of this subsection shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

14. CORRECTION, UTILIZATION OF DEFECTIVE WORK

14.1 REJECTED MATERIALS AND WORKMANSHIP

The Engineer shall have the right to reject materials and workmanship which are defective, or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the Owner. If the Contractor does not correct such rejected work within a reasonable time, fixed by written notice, the Owner may correct same and charge the expense to the Contractor.

14.2 RE-INSPECTION

Should it be considered necessary or advisable by the Engineer at any time before final acceptance of the entire work to make an examination of work already completed, by removing or tearing out any portion thereof, the Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to the fault of the Contractor or his Subcontractor, he shall defray all the expenses of such examinations and satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the additional cost of labor and materials necessarily involved in such examination and placement shall be paid to Contractor as provided elsewhere.

15. INSURANCE

15.1 GENERAL

The Certificate of Insurance shall be completed and submitted to the Owner prior to construction beginning on the project.

15.2 WORKMEN'S COMPENSATION AND LIABILITY INSURANCE

15.2.1. In addition to such other insurance that may be required under this Contract, the Contractor shall provide workmen's compensation insurance for all employees employed under this Contract on the project who may come within the protection of workmen's compensation laws and shall provide, where practicable, Employer's Liability (Stop Gap) insurance for the benefit of his employees not protected by such compensation laws, and proof of such insurance satisfactory to the Owner shall be given.

15.2.2 Subcontractors: The Contractor will be charged with responsibility for proper and adequate workmen's compensation coverage for all his subcontract operations, and in the event the Contractor's insurance does not cover each and every Subcontractor, certificates of insurance issued on policies by companies that may be acceptable to the Owner covering each and every Subcontractor shall be filed with the Owner prior to the commencement of such subcontract operation.

15.2.3. Indemnification: In any and all claims against the Owner or the Engineer, or any of their agents or employees, by any employee of the Contractor, the Subcontractor, anyone directly or indirectly employed by any of them, or

anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

15.3 PUBLIC LIABILITY INSURANCE

15.3.1. The Contractor shall obtain and maintain in full force and effect during the term of the contract Public Liability and Property Damage insurance as set forth below with insurance companies acceptable to the Owner.

15.3.2. The Contractor shall submit to the Owner a Certificate of Insurance evidencing the insurance carrier, coverage, and terms as specified in this contract. The Contractor may not begin work on the project until the Certificate of Insurance has been received by the Owner. Failure of the Contractor to fully comply with insurance requirements will be considered a material breach of contract and shall be cause for immediate termination of the contract at the option of the Owner.

15.3.3. The Contractor shall not cause any policy to be cancelled or permit it to lapse, and all policies shall include a clause to the effect that the policy of certificate shall not be subject to cancellation or to a reduction in the required limits of liability or amounts of insurance or any other material change without giving the Owner forty-five (45) days' notice of such cancellation or material change.

15.3.4. Minimum Limits

Commercial General Liability

General Aggregate	\$1,000,000
Products/Completed Operations Agg.	\$1,000,000
Personal & Advertising Injury Limit	\$1,000,000
Each Occurrence	\$1,000,000

Auto Liability for Owned, Non-owned, and Hired Autos (Symbol 1)

Bodily Injury and Property Damage Combined	
Single Limit	\$1,000,000
Employers Liability	
(Washington Stop Gap)	
Each Accident	\$1,000,000
Each Employee & Policy Limit	
For Disease	\$1,000,000

15.3.5. The Contractor shall name the Owner and Engineer as Additional "Named Insureds" on the General and Auto Liability policies at no cost to the Owner or Engineer.

15.3.6. All subcontractors will carry insurance in like kind and amount as Contractor. It is the responsibility of the Contractor to obtain Certificates of Insurance from subcontractors evidencing such insurance.

15.3.7. The above insurance shall cover the Owner, Engineer, Contractor and Subcontractors for claims or damages for bodily injury, including wrongful death, as well as other claims for property damage which may arise from operations under this Contract whether such operations be by himself or by any Subcontractor or anyone directly employed by either of them and the Contractor agrees, in addition, to indemnify and save harmless the Owner and Engineer, either or both, from all suits, claims, demands, judgments and attorney's fees, expenses or losses occasioned by the performance of this Contract by himself, any Subcontractor, or persons working directly or indirectly for him, specially holding Owner and Engineer harmless thereon.

15.3.8. All certificates of insurance, authenticated by the proper officer of the insurer, shall state in particular those insured, the extent of the insurance, the location and operations to which the insurance applies, the expiration date, and the above mentioned notice of cancellation clause.

15.4 BUILDER'S RISK INSURANCE

The Contractor shall maintain during the life of the Contract, Builders Risk Special Form insurance for 100% of the completed value of the project, including loss or damage from a covered peril resulting from faulty workmanship, faulty material, or error and omission in design, plan or specification. An Installation Floater with coverage no more restrictive than the builders Risk Special Form may be used in lieu of the Builders Risk form when appropriate. The Owner is to be an additional "named insured" on the policy.

The insurance carrier shall be notified by Contractor immediately of partial occupation or use by Owner. Such partial occupation or use shall not void insurance.

16. CONTRACT SECURITY

16.1 PERFORMANCE BOND

16.1.1. The Contractor shall, prior to beginning construction, furnish the Owner with a Performance Bond in penal sum equal to the amount of the contract price, conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions and agreements of the Contract Documents, and upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the work provided by the Contract Documents. Such bonds shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the state in which the work is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570.

16.1.2. The expense of these bonds shall be borne by the Contractor. If at any time a Surety on any such bond is declared a bankrupt or loses its right to do business in the state in which the work is to be performed or is removed from the list of Surety Companies Acceptable on Federal Bonds, Contractor shall substitute an acceptable bond (or bonds) in such form and sum and signed by such other Surety or Sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new Surety or Sureties shall have furnished an acceptable bond to the Owner.

17. PROPERTY RESTORATION

17.1 PUBLIC COMPLAINTS

Whenever the Contractor fails to repair or restore existing improvements damaged by his operations within seventy-two (72) hours of written notice, the Owner may order said work done by others and all costs incurred shall be paid by the Contractor.

18. SEPARATE CONTRACTS

18.1 OWNER FREE FROM DAMAGE CLAIMS

If, through acts of neglect or unjustified omissions or default on the part of the Contractor, another contractor or any subcontractor of any other contractor shall suffer loss or damage to the work, the Contractor agrees to settle with such other contractor or subcontractor by agreement or arbitration, if such contractor or subcontractor will so settle. If such other contractor or subcontractor shall assert any claim against the Owner on account of any damage alleged to have been so sustained, the Owner shall notify the Contractor, who shall indemnify, and save harmless the Owner and shall assume and pay for the defense costs of any such claims, provided however that the Contractor shall have no liability to indemnify against liability for loss or damages caused by or resulting from the sole negligence of the Owner and/or Engineer, and in the event that such liability for loss or damages to work is caused by the concurrent negligence of the Owner and/or Engineer or its agents or employees and the Contractor or its agents or employees, the obligation hereof shall be enforceable only to the extent of the Contractor's negligence.

19. SUBCONTRACTORS

19.1 SPECIALTY SUBCONTRACTORS

Specialty Subcontractors shall be utilized for the performance of such parts of the work under this Contract as under normal contract practices, are performed by Specialty Subcontractors, unless the Owner determines that the Contractor has heretofore customarily performed such specialty work with his own organization and is equipped to do so, or unless the Owner determines that performance of the specialty work by Specialty Subcontractors will result in increased costs or inordinate delays.

19.2 CONTRACTOR RESPONSIBLE FOR SUBCONTRACTORS

The Contractor shall not subcontract any work to be performed or any materials to be furnished in the performance of the Contract without the prior written consent of the Owner. If the Contractor shall subcontract any part of this Contract, the Contractor shall be fully responsible to the Owner for the acts and omissions of his Subcontractor and of the persons either directly or indirectly employed by the Subcontractor, as he is for the acts and omissions of himself and of persons directly employed by himself. Nothing contained in this Contract shall create any contractual relation between any Subcontractor and the Owner.

19.3 OWNER'S APPROVAL OF SUBCONTRACTOR

The Owner's consent to or approval of any subcontract under this Contract shall not in any way relieve the Contractor of his obligations under this Contract and no such consent or approval shall be deemed to waive any provisions of this Contract.

20. ENGINEER'S AUTHORITY

20.1 LIMITATION

The Engineer will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

21. LAND AND RIGHT-OF-WAY

21.1 PROVIDED BY CONTRACTOR

The Contractor shall provide at his own expense and without liability to the Owner any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials.

21.2 WORK ON RIGHT-OF-WAY OTHER THAN OWNER'S

21.2.1. Work on railroad, state highway, other public road, or any right-of-way other than the Owner's shall be in conformity with the requirements of the authority having jurisdiction over such right-of-way. It will be the Contractor's responsibility to notify said authority before beginning work on the right-of-way at least forty-eight (48) hours in advance, and to ascertain the restoration requirements and determine that the schedule of operations proposed is satisfactory to the authority.

21.3 WATER COURSES

The Contractor shall provide for the flow of all water courses, sewers or drains, intercepted or disturbed by the Contractor during the progress of the work, and shall pay any damage that may be caused by flood waters, alterations of flow patterns and all erosion damage resulting therefrom.

22. WARRANTIES

22.1 GENERAL GUARANTEE AND WARRANTY

22.1.1. For a period of one (1) year from the date of final acceptance of the project, or for the time fixed in Section 01700, workmanship and materials, and equipment furnished by the Contractor and incorporated in the project, shall be guaranteed by the Contractor to remain in normal working order and condition except where abused or neglected by the Owner, and the Contractor shall repair or replace at his own expense any work or material that may prove to be defective during the period of this guarantee. The Contractor shall obtain warranties from subcontractors and suppliers of materials or equipment where such warranties are specifically required herein, and shall deliver copies to the Owner upon completion of the work.

22.1.2. Neither the final certificate of payment nor any provision in the Contract nor partial or entire use or occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the Contract

or relieve the Contractor of liability in respect to any express warranties or responsibilities for faulty materials and workmanship.

22.2 EQUIPMENT WARRANTY

Where required, equipment furnished shall bear a one (1) year (from date fixed in Article 29.1.1.) manufacturer's warranty against defects in materials and workmanship, in addition to the Contractor's one year guarantee unless specified elsewhere in these Specifications. All parts or equipment found defective or showing signs of undue wear within one (1) year from date of final acceptance, shall be replaced at no cost to the Owner. The warranty shall be in full effect with no qualifications or reservations.

23. COMPLIANCE WITH LAWS

23.1 GENERAL

23.1.1 In all operations connected with the work embraced in this agreement, the Contractor shall be held responsible for any failure to respect, adhere to, and comply with, all ordinances, laws and public permits governing, controlling or limiting in any way the action of those engaged upon the work.

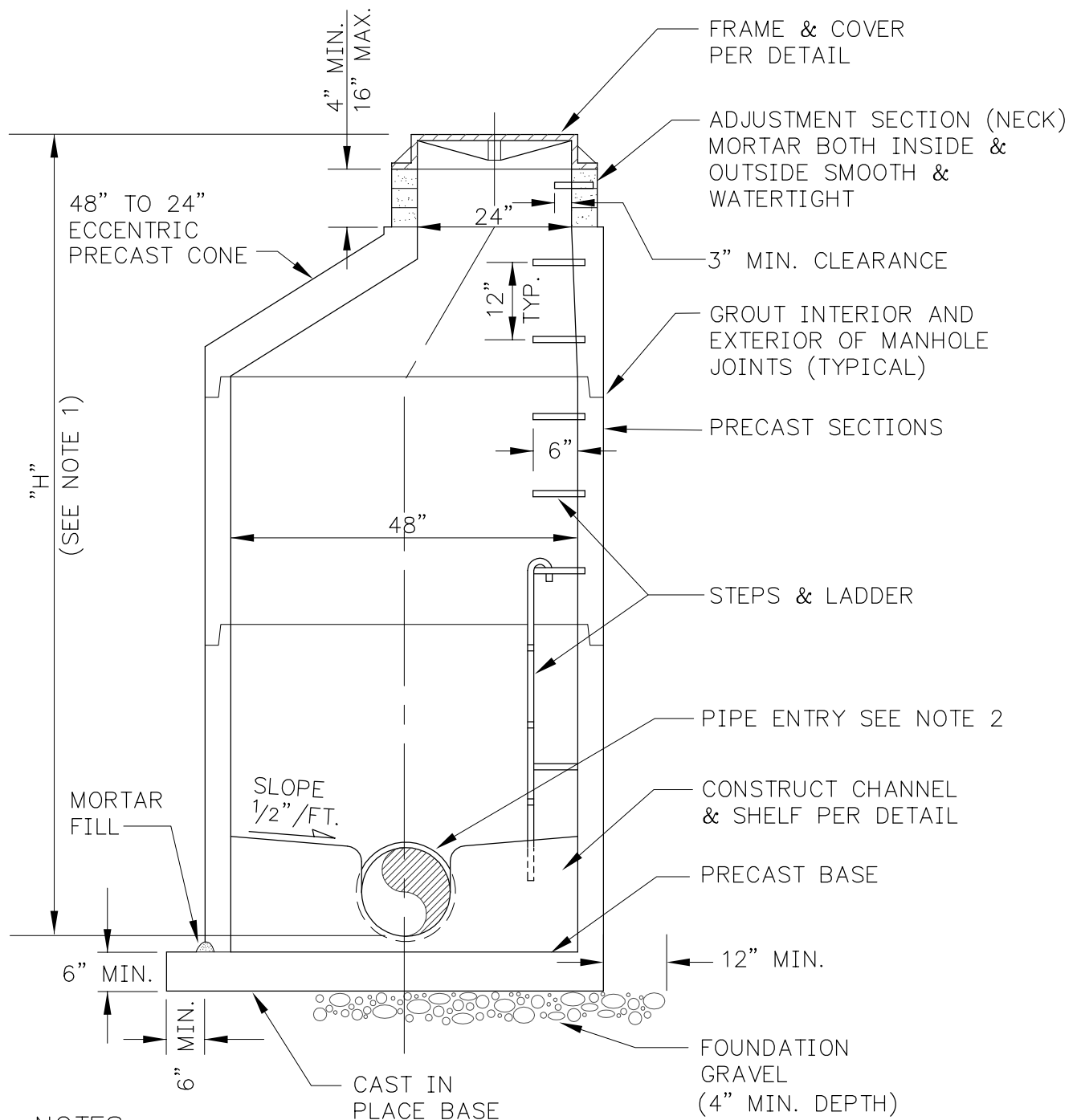
23.1.2 If Contractor observes that the Specifications or Drawings are at variance with any laws or regulations, Contractor shall give Engineer prompt written notice thereof. If Contractor performs any work knowing or having reason to know that it is contrary to such laws or regulations, and without such notice to Engineer, Contractor shall bear all costs arising therefrom.

* * * END OF SECTION * * *

SECTION 00880 DETAILS INDEX

<u>Detail No.</u>	<u>Title</u>	<u>Page</u>
1	Type I – 48" Manhole	00880-2
2	Type IIIA – 48" Manhole	00880-3
2A	Saddle Type 48" Drop In Manhole	00880-4
3	Manhole Frame and Cover	00880-5
4	Manhole Steps and Ladder	00880-6
5	Outside Drop Manhole Connection	00880-7
6	Inside Drop Manhole Connection	00880-8
7	Manhole Channeling	00880-9
8	Sewer Cleanout	00880-10
9	Street Side Sewer Stub	00880-11
10	Sewer Air and Vacuum Release Assembly	00880-12
11	Concrete Pipe Anchor	00880-13
12	Rigid Pipe Bedding	00880-14
13	Class F - Flexible Pipe Bedding	00880-15
14	Foundation Gravel and Backfill	00880-16
15	Manhole Butt Joint	00880-17

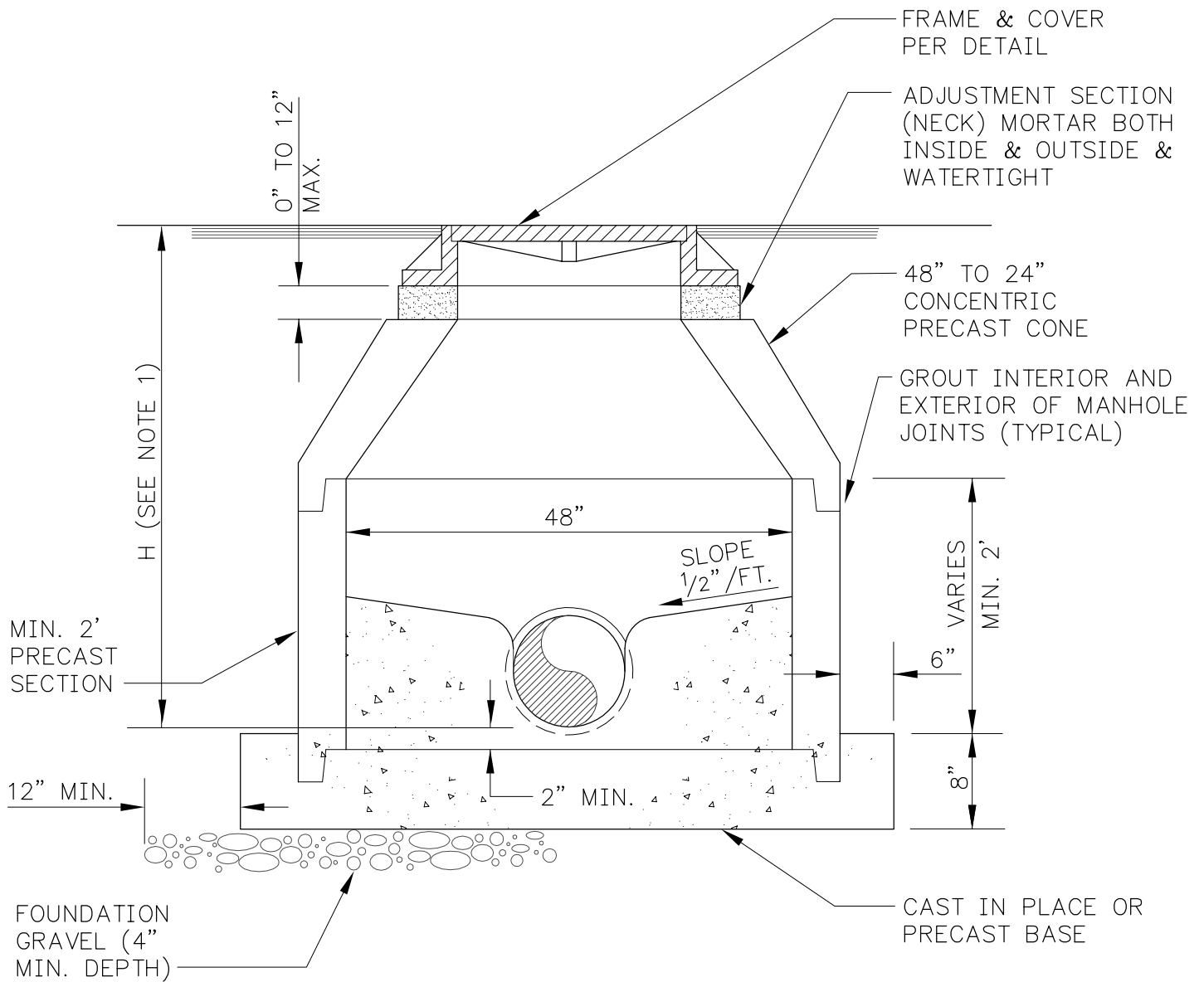
* * * END OF SECTION * * *



NOTES:

1. WHEN "H" IS LESS THAN 5', USE TYPE IIIA-48" MANHOLE
2. WALL OPENING REQUIREMENTS FOR PIPE:
 - A. HOLE SIZE TO EQUAL PIPE O.D. PLUS MANHOLE WALL THICKNESS
 - B. ALL PIPES SHALL BE AIMED AT THE CENTER OF MANHOLE AND HAVE 8" MINIMUM BETWEEN HOLES
 - C. MAXIMUM PIPE SIZE 21"
 - D. MANHOLE PIPE ENTRY COUPLING REQUIRED FOR PVC PIPE

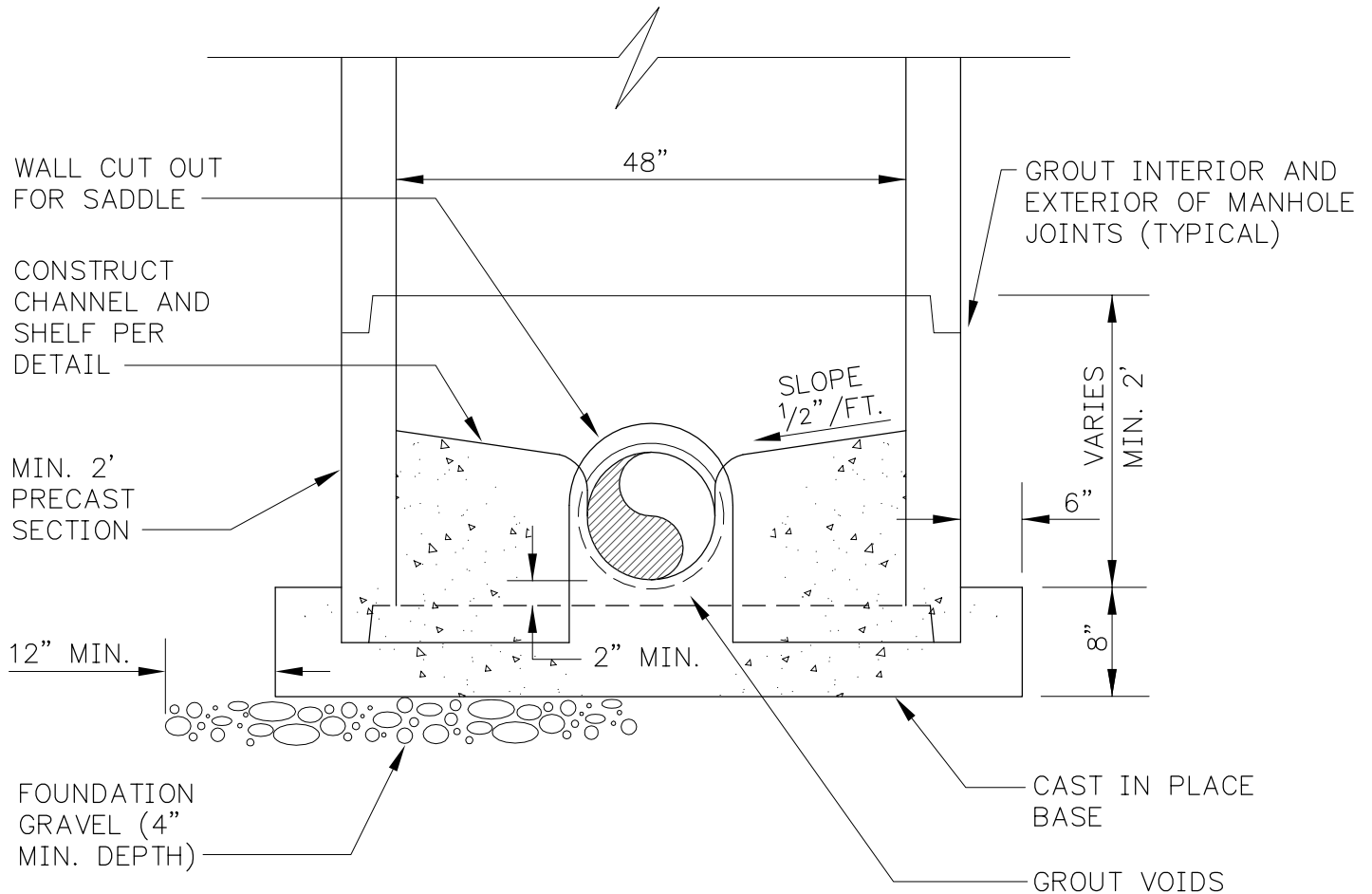
1 TYPE I - 48" MANHOLE



NOTES:

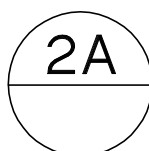
1. MAXIMUM H IS 5'. WHEN H IS LESS THAN 3'-6" USE A CONCENTRIC FLAT TOP SLAB
2. TO BE USED ONLY WITH PRIOR AUTHORIZATION
3. MAXIMUM PIPE SIZE 12"
4. PIPE MANHOLE COLLAR REQUIRED FOR PVC PIPE

2 TYPE IIIA - 48" MANHOLE

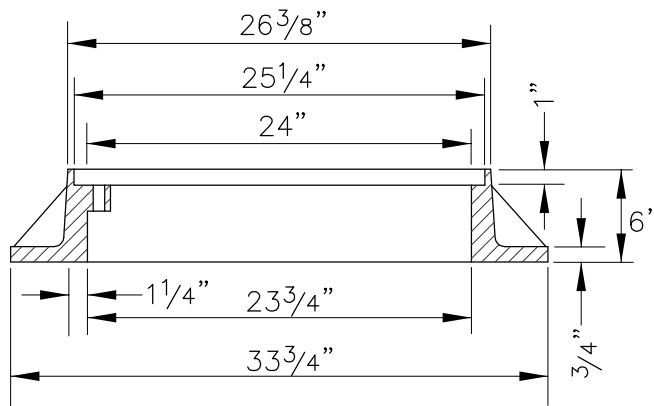
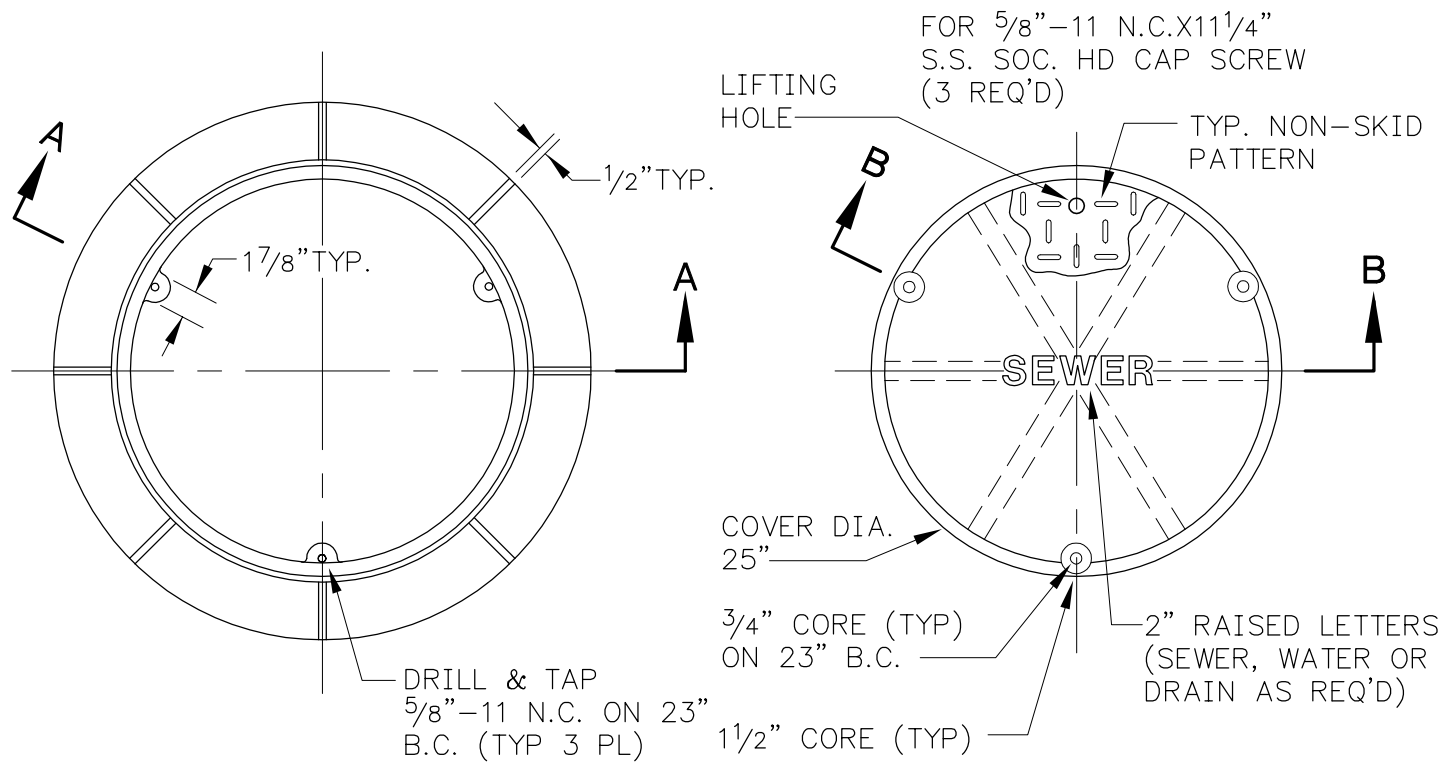


NOTES:

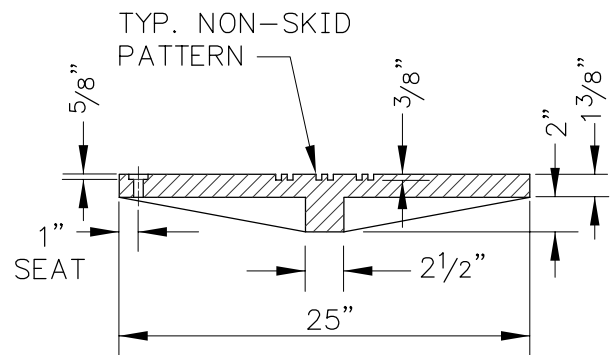
1. SEWER MAIN TO REMAIN IN SERVICE THROUGHOUT CONSTRUCTION PERIOD.
2. DO NOT CUT INTO SEWER MAIN UNTIL REMAINDER OF EXTENSION IS READY FOR SERVICE AND AUTHORIZED BY DISTRICT.



SADDLE TYPE 48" DROP IN MANHOLE



SECTION A-A

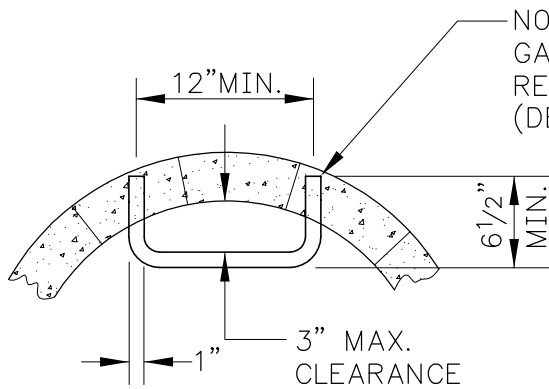


SECTION B-B

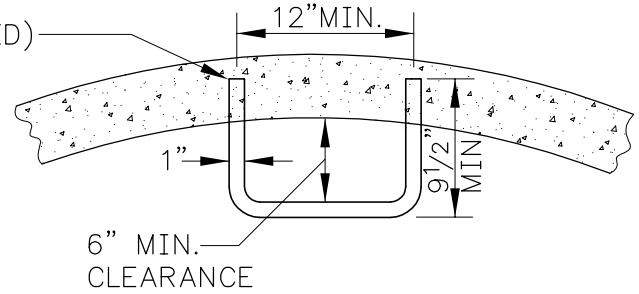
NOTES:

1. DRILL LUG HOLES FULL DEPTH
2. BOLT COVER TO LUGS IN RING
3. PROVIDE $\frac{7}{8}$ " ϕ LIFTING HOLE
4. DUCTILE IRON COVER, CAST IRON FRAME
5. SEE SPECIFICATION 02605 FOR ADDITIONAL REQUIREMENTS
6. FRAME AND COVER PER APWA

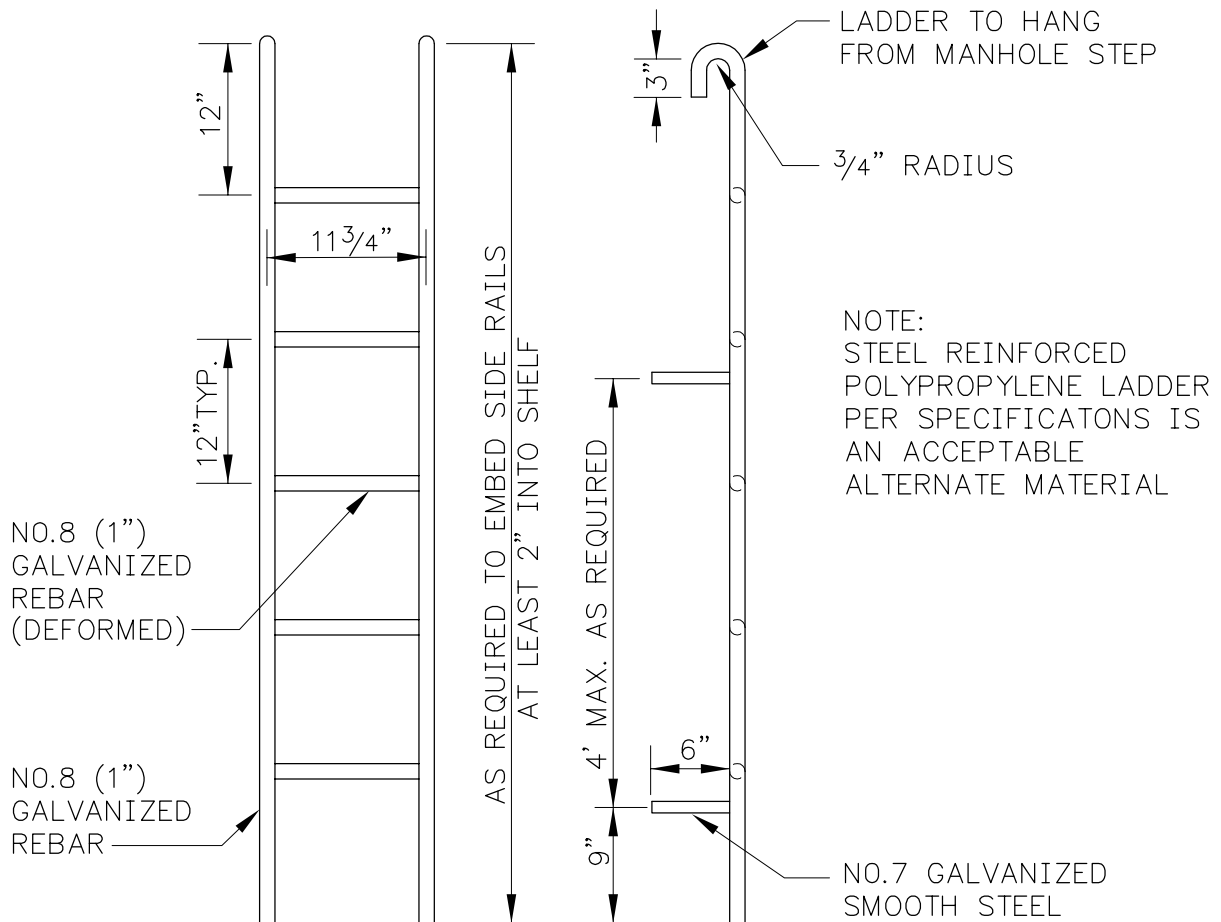
3 MANHOLE FRAME AND COVER



ADJUSTMENT RING HAND HOLD

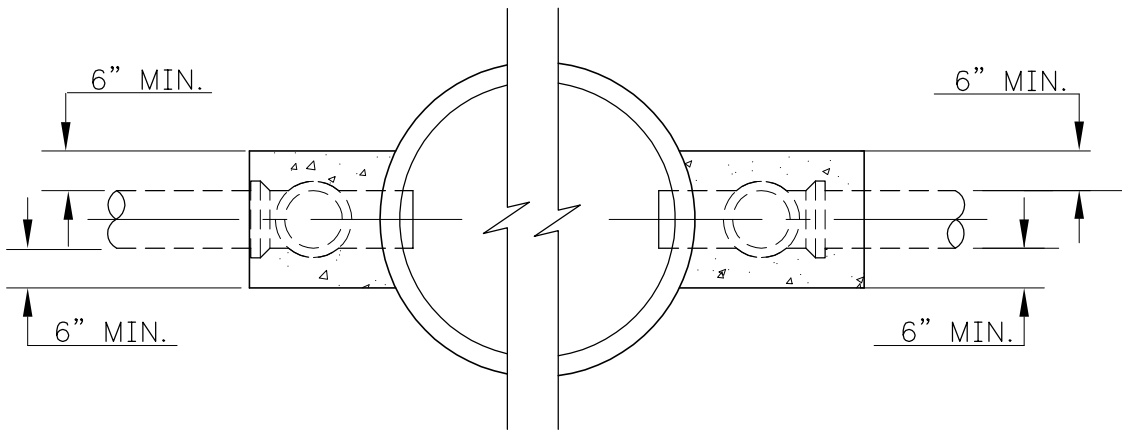


TYPICAL MANHOLE STEP

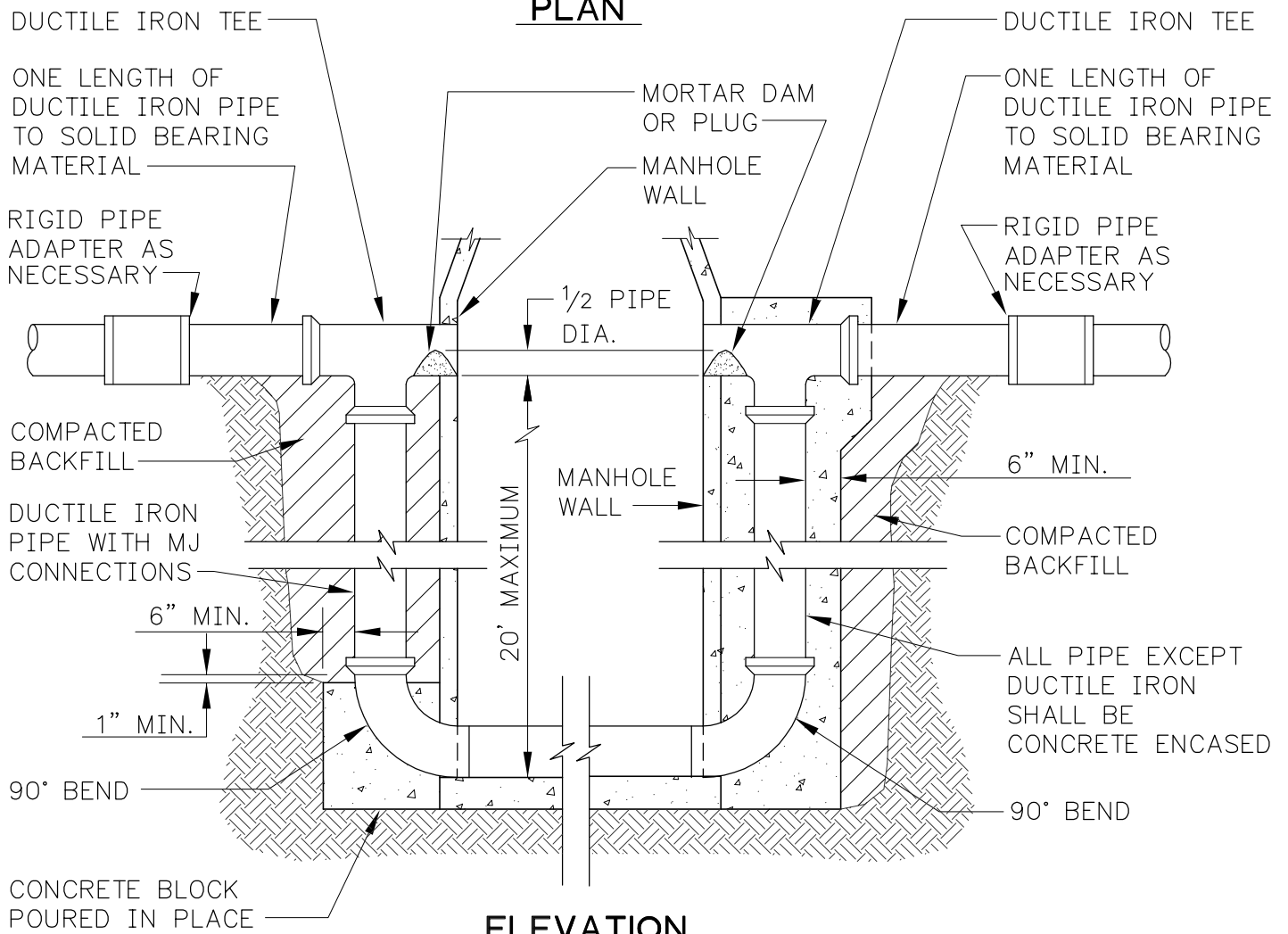


PREFABRICATED LADDER

4 MANHOLE STEPS AND LADDER



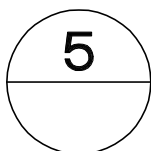
PLAN



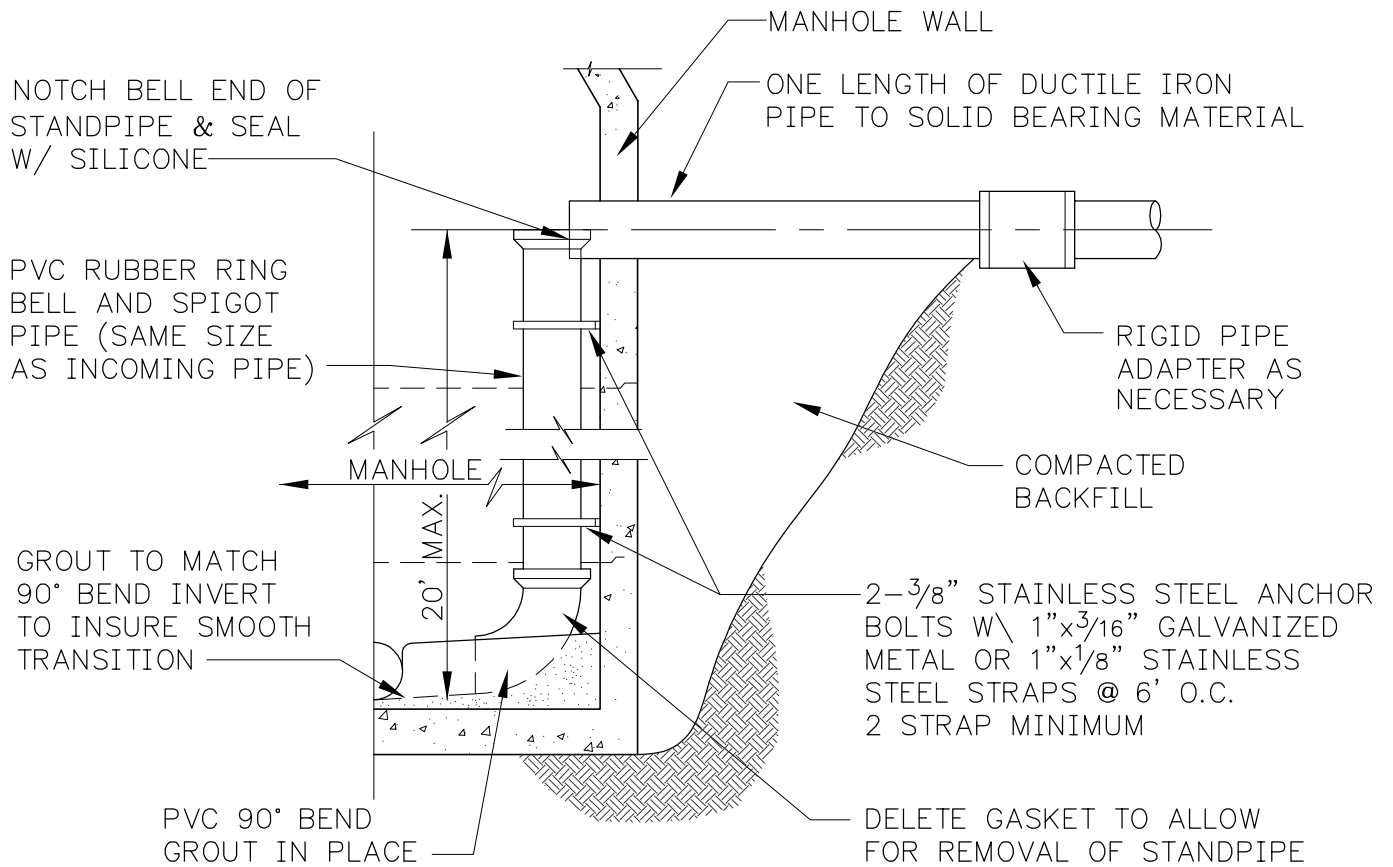
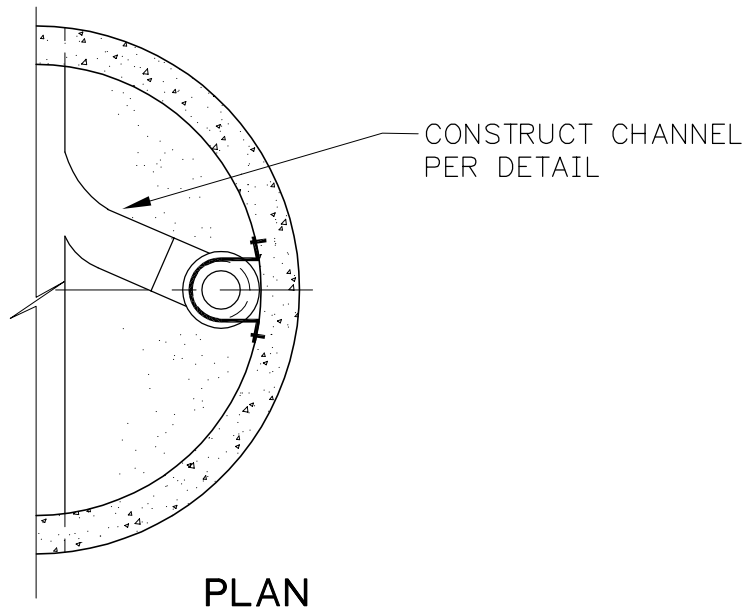
ELEVATION

**DUCTILE IRON
ALTERNATIVE**

**CONCRETE ENCASED
ALTERNATIVE**



OUTSIDE DROP MANHOLE CONNECTION

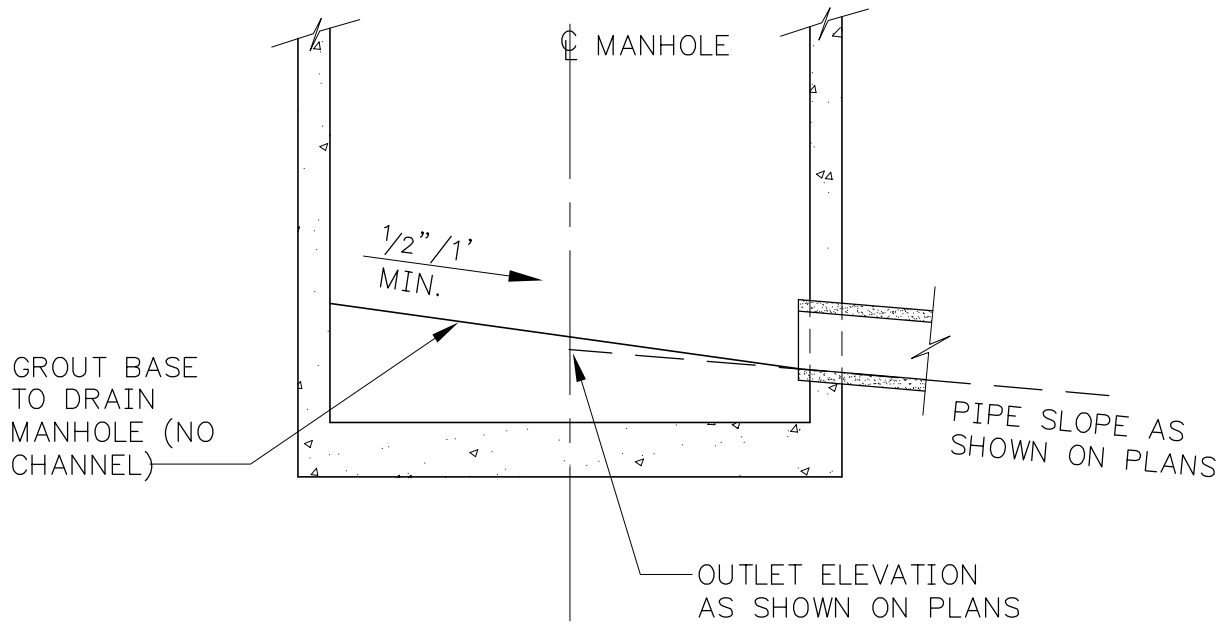


ELEVATION

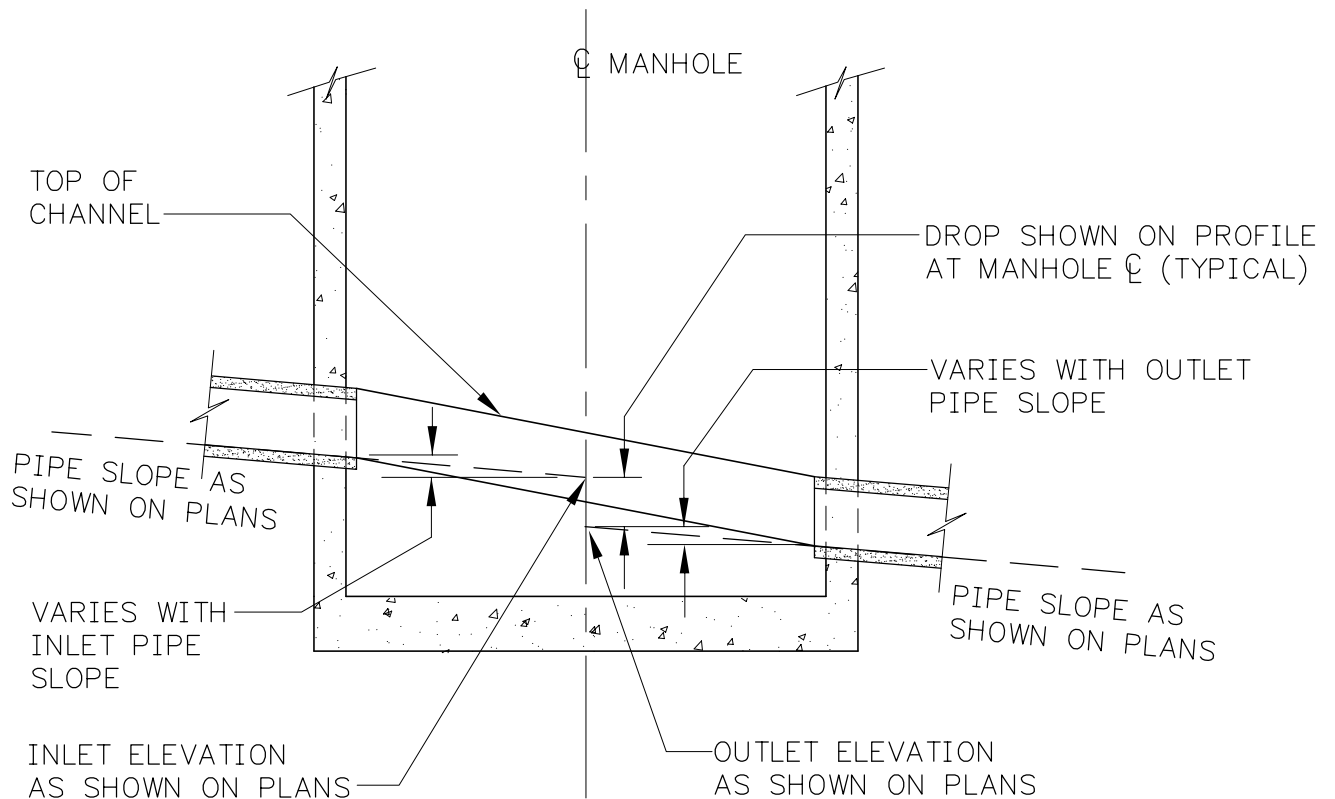
NOTE: THIS ASSEMBLY TO BE USED ONLY
WITH SPECIFIC AUTHORIZATION

INSIDE DROP MANHOLE CONNECTION

6

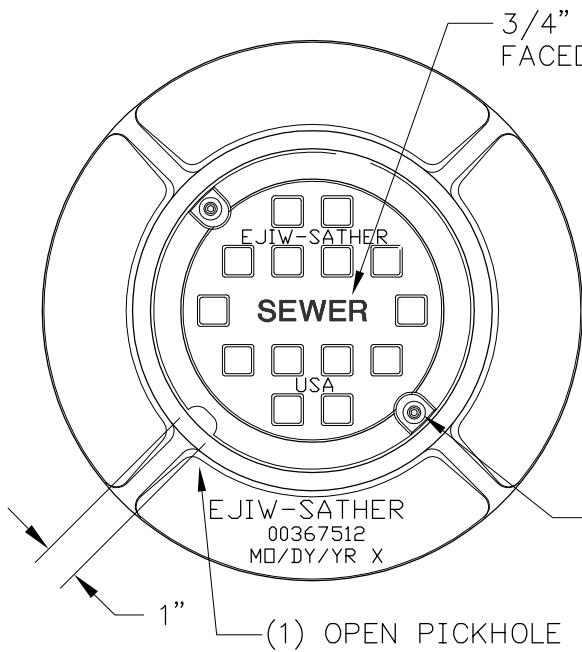


TERMINAL MANHOLE

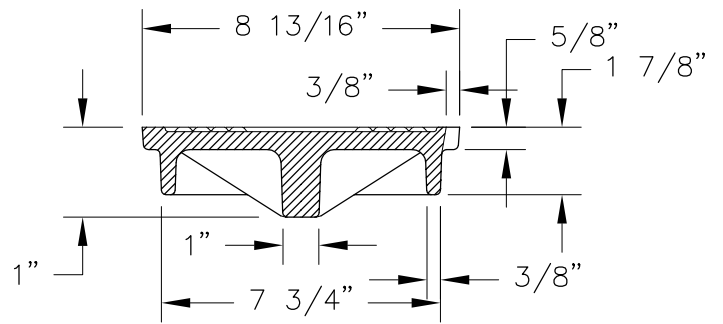


MAIN-LINE MANHOLE

7 MANHOLE CHANNELING



PLAN

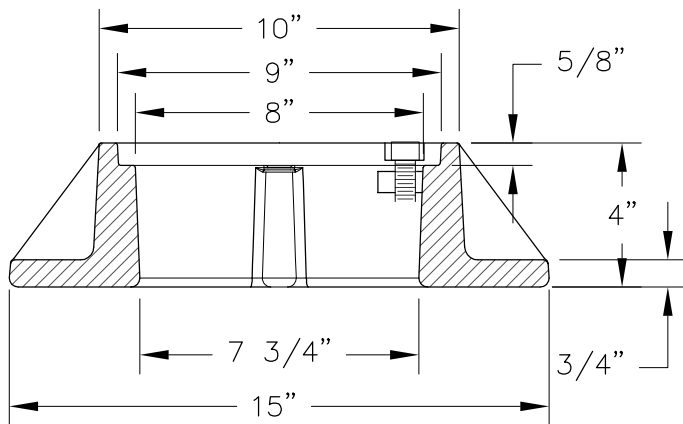


ELEVATION CAST IRON COVER

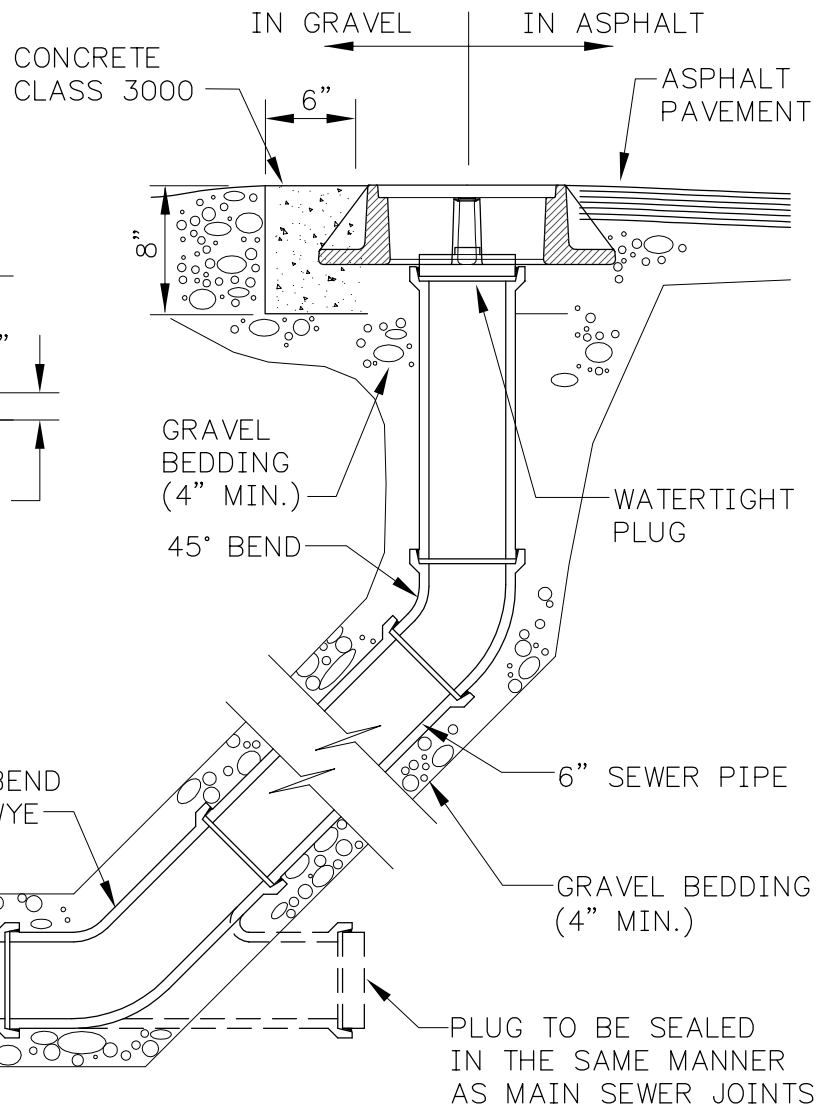
NOTE

IN SOFTSCAPE USE
CARSON MODEL 910-4
CLEANOUT COVER

(2) 3/8"-16x0.75" SS SOCKET
HEAD CAP SCREW W/WSHRS
ON AN 8" DIA. BOLT CIRCLE

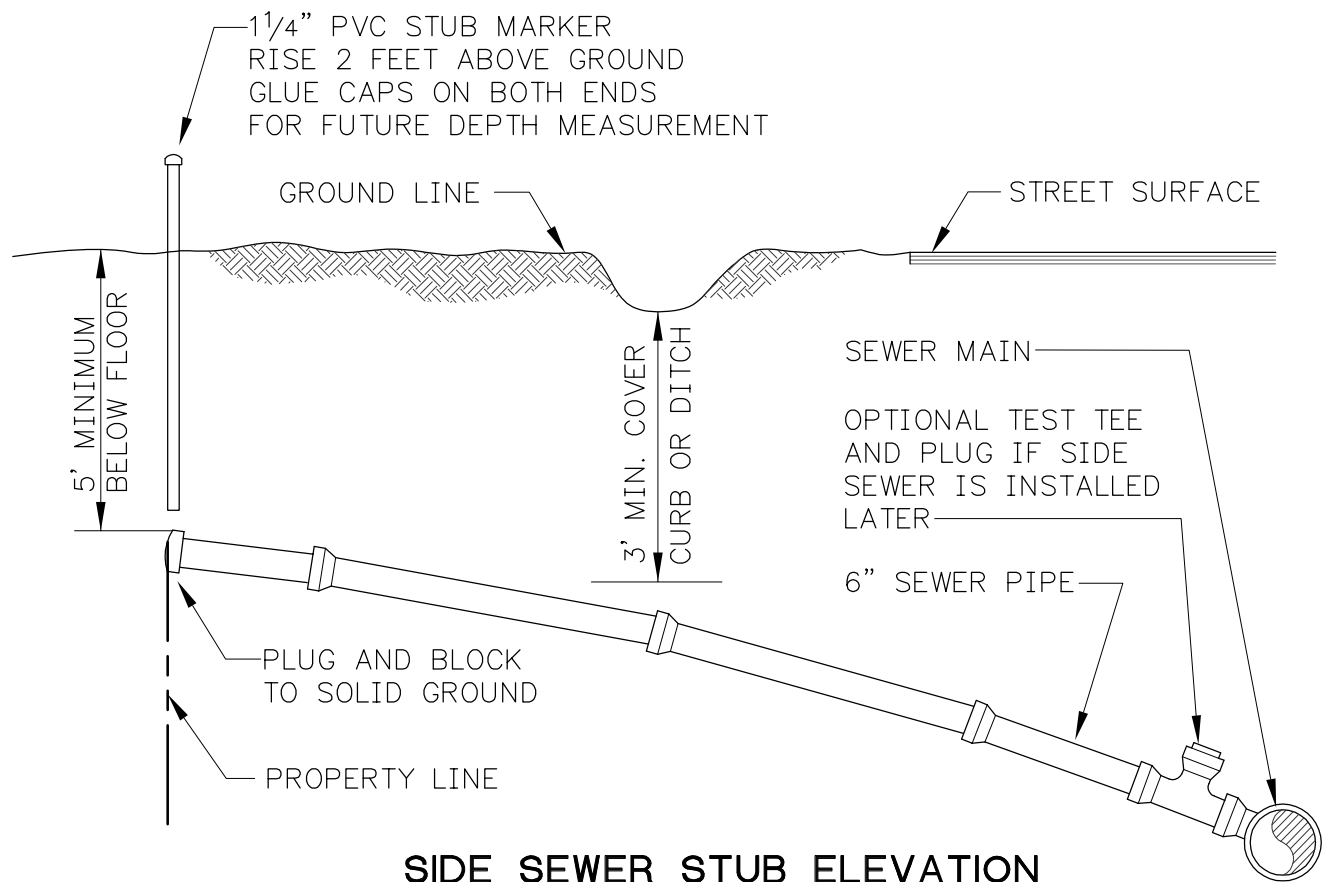
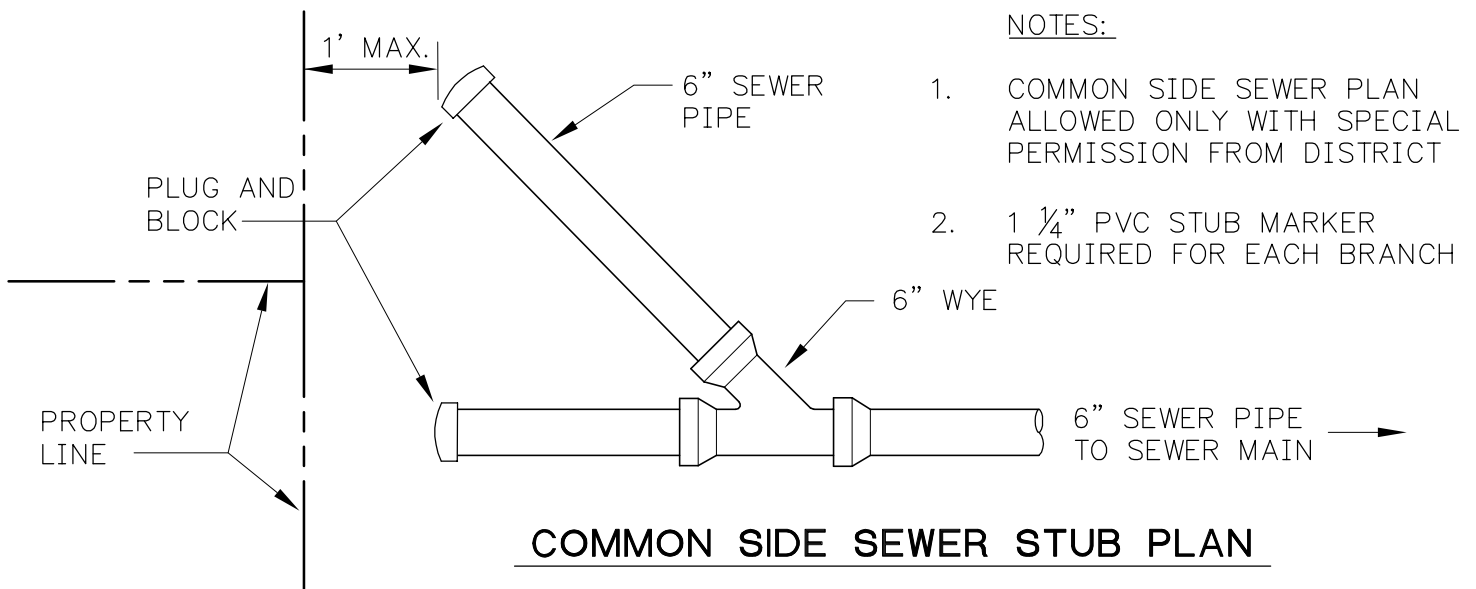


ELEVATION CAST IRON RING



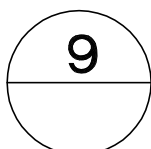
8

SEWER CLEANOUT



NOTES:

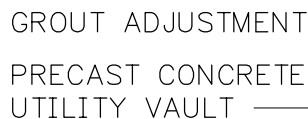
1. 6" MINIMUM SIZE PIPE TO PROPERTY LINE. MAXIMUM DEFLECTION PER JOINT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
2. MAXIMUM SLOPE = 2 VERTICAL : 1 HORIZONTAL (200%)
3. MINIMUM SLOPE = 2%



STREET SIDE SEWER STUB



36"x36" HINGED COVER
(SEE SPECIFICATIONS)



PROVIDE 2" CLEARANCE
AROUND PIPE WITH
FLEXIBLE ADAPTER ———

SWING
JOINT-

PIPE SADDLE

SEWER
FORCE
MAIN -

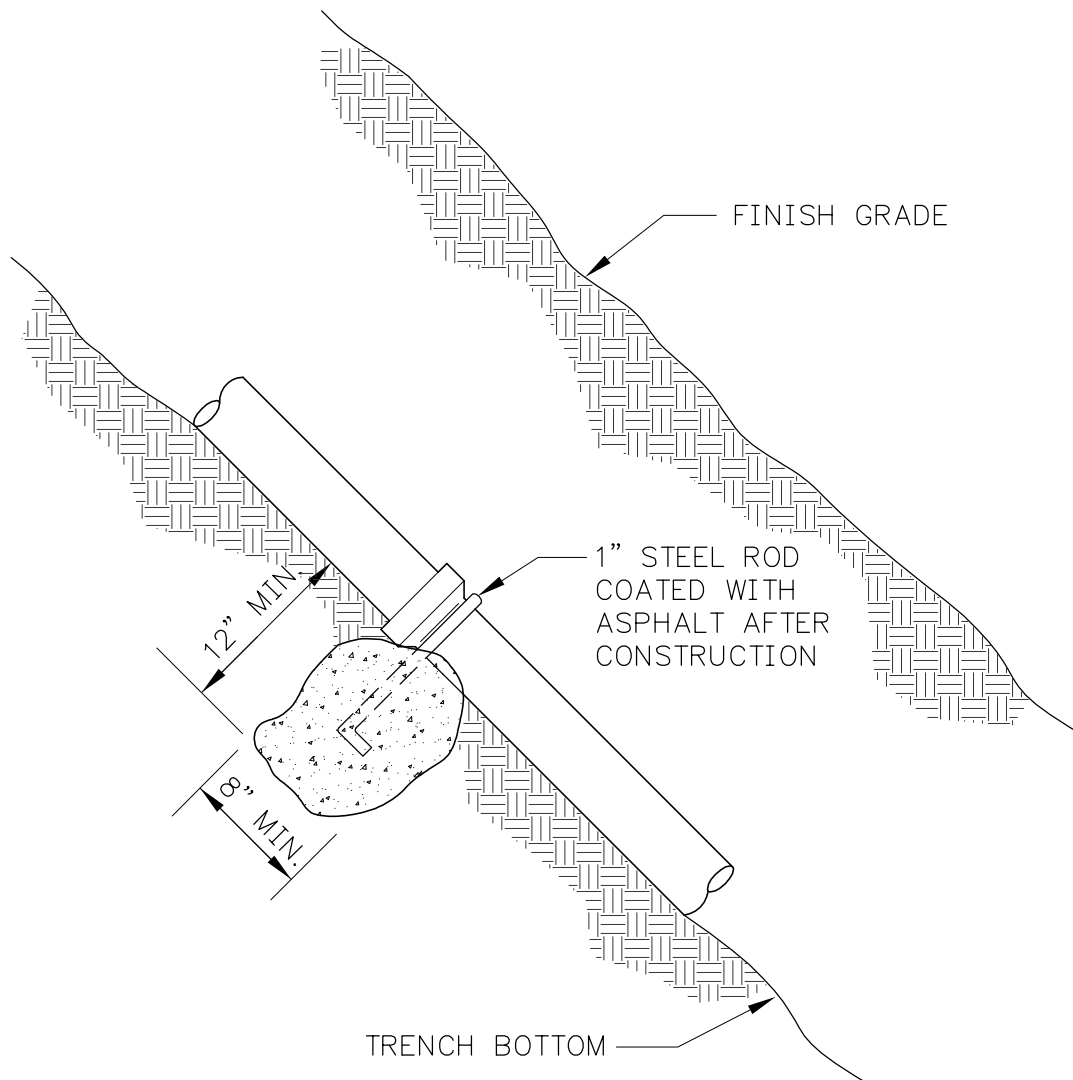
DRAIN
HOLES

- GRAVEL BEDDING
- 4"x8"x16" CONCRETE BEARING BLOCK

ELEVATION

- 10

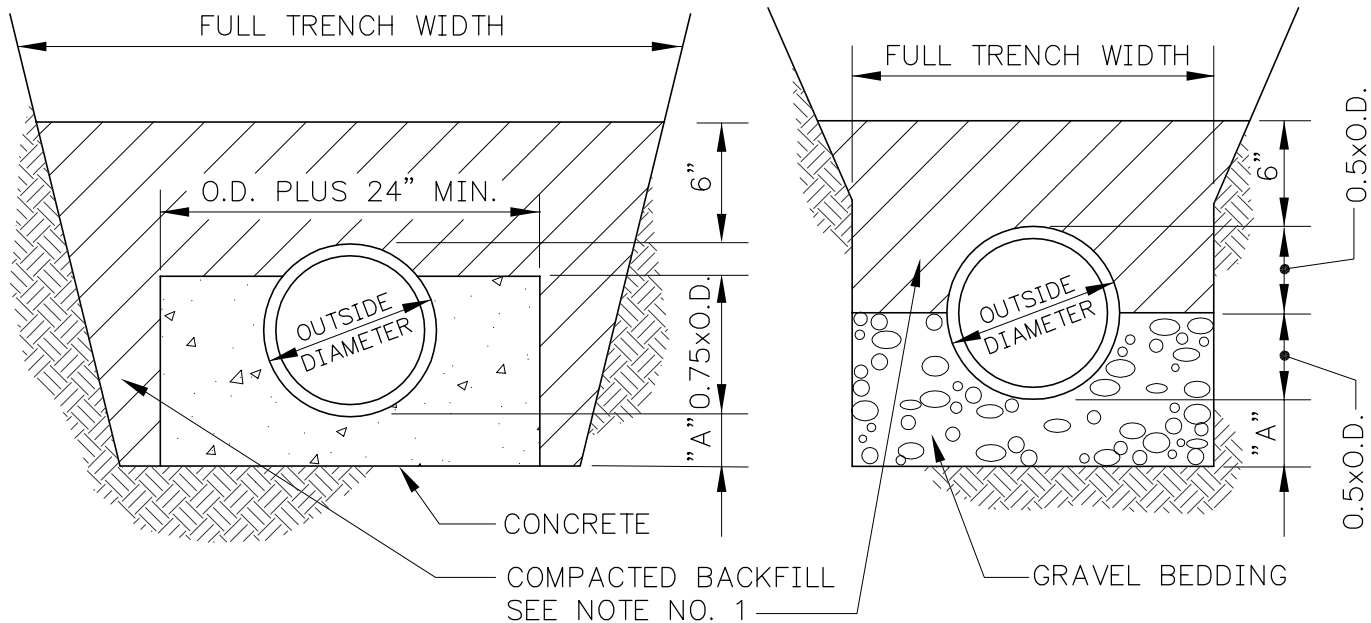
SEWER AIR AND VACUUM RELEASE ASSEMBLY



NOTES:

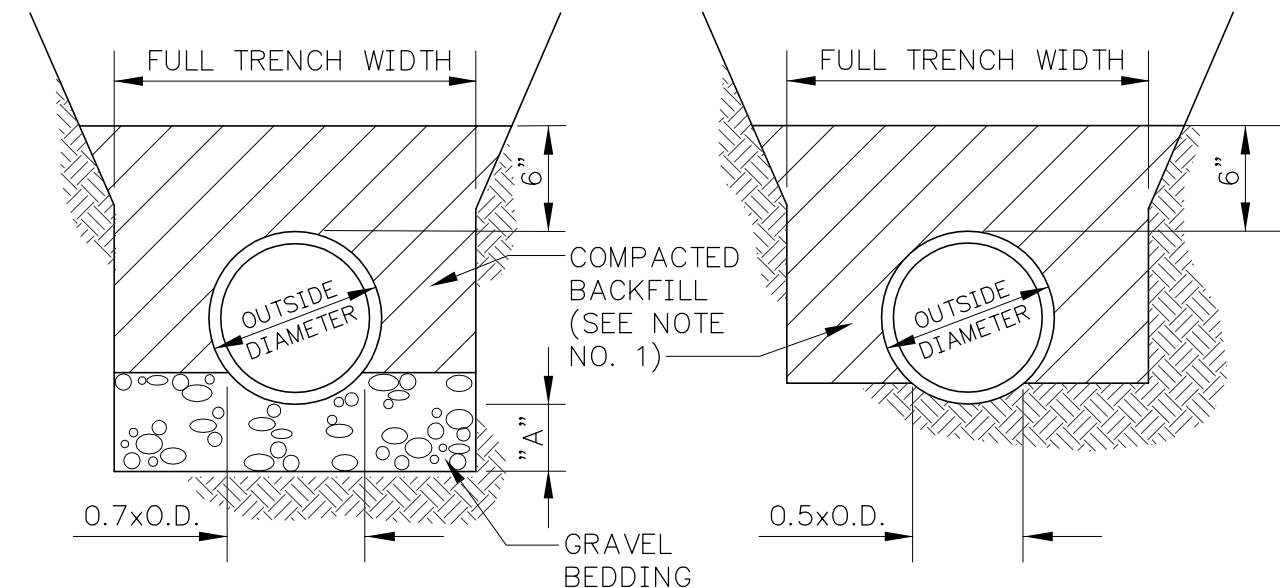
1. MINIMUM ANCHOR WIDTH TO BE 1.5 TIMES PIPE DIAMETER, UNLESS OTHERWISE NOTED.
2. POUR BLOCKING AGAINST UNDISTURBED SOIL.
3. MINIMUM STRENGTH OF CONCRETE TO BE 2500 PSI.
4. MINIMUM SPACING BETWEEN ANCHORS TO BE 36' ON GRADES OF 20–30%, 20' ON GRADES OF 30–50%, AND 16' ON GRADES OVER 50%.

11 CONCRETE PIPE ANCHOR



**CLASS A
CONCRETE BEDDING**

**CLASS B
NORMAL GRAVEL BEDDING**

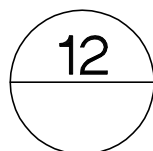


**CLASS C
SHALLOW GRAVEL BEDDING**

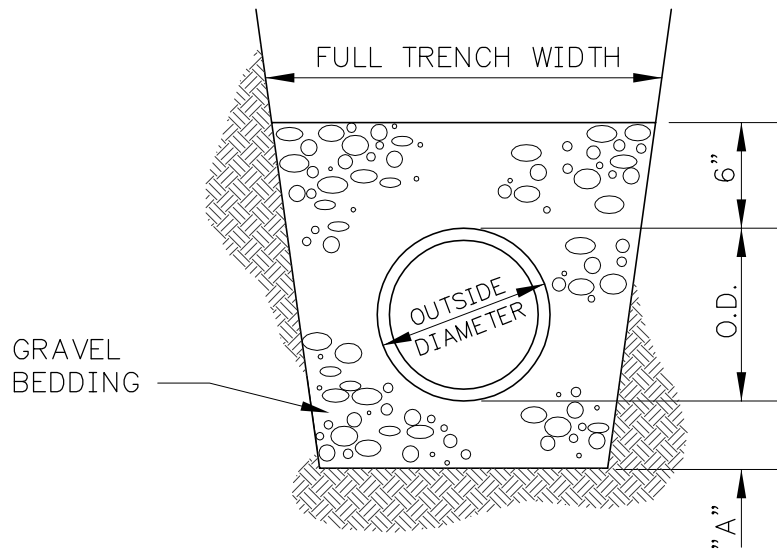
**CLASS D
NATIVE BEDDING**

NOTES:

1. EARTH TO BE COMPACTED IN MAXIMUM OF 6" LIFTS
2. "A"=4" FOR PIPE WITH OUTSIDE DIAMETERS 27" AND SMALLER
"A"=6" FOR PIPE WITH OUTSIDE DIAMETERS 30' AND LARGER

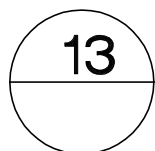


RIGID PIPE BEDDING

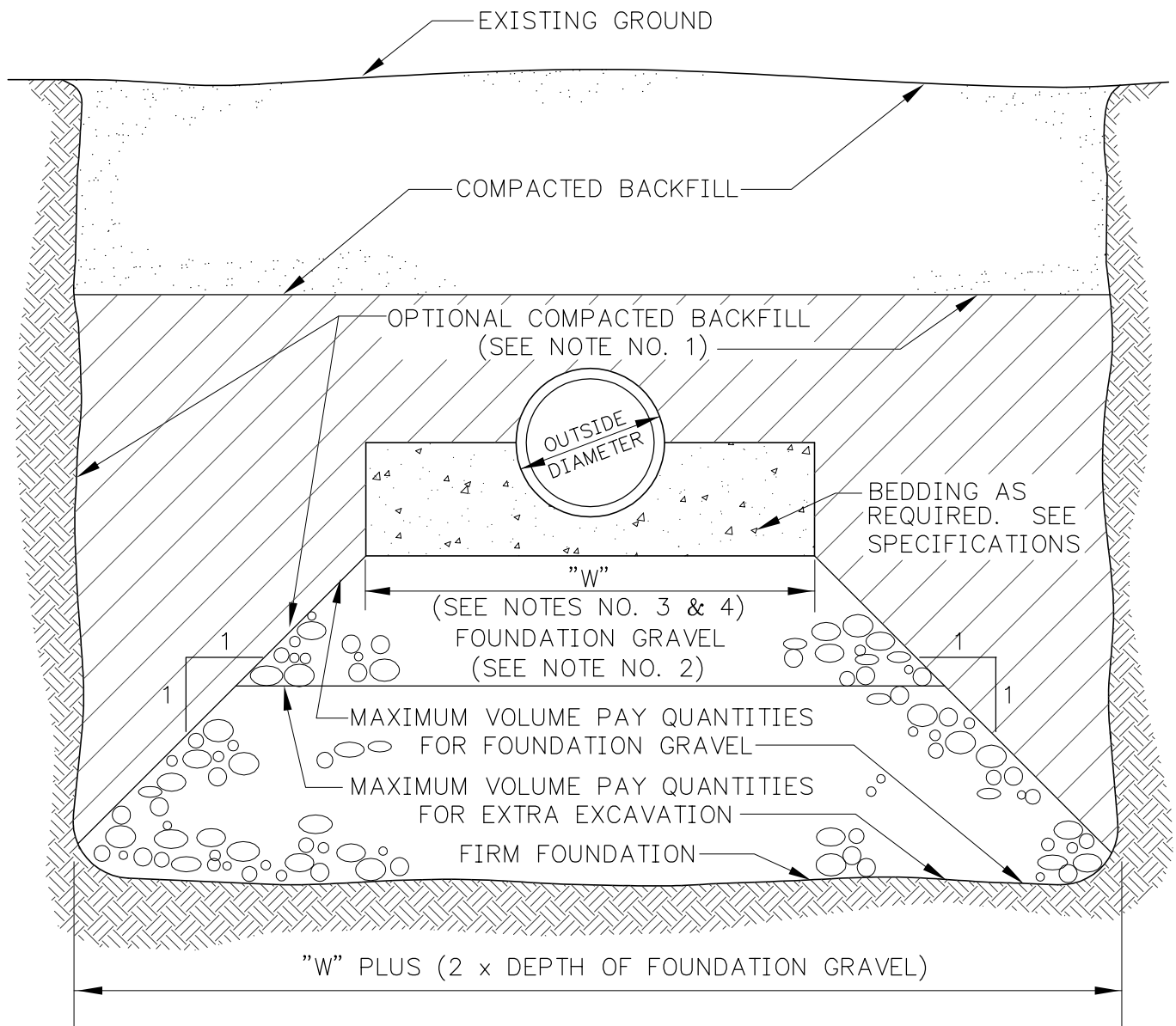


NOTES:

1. MATERIAL TO BE COMPACTED IN MAXIMUM OF 6" LIFTS
2. "A"=4" FOR PIPE WITH OUTSIDE DIAMETERS 27" AND SMALLER
 "A"=6" FOR PIPE WITH OUTSIDE DIAMETERS 30" AND LARGER

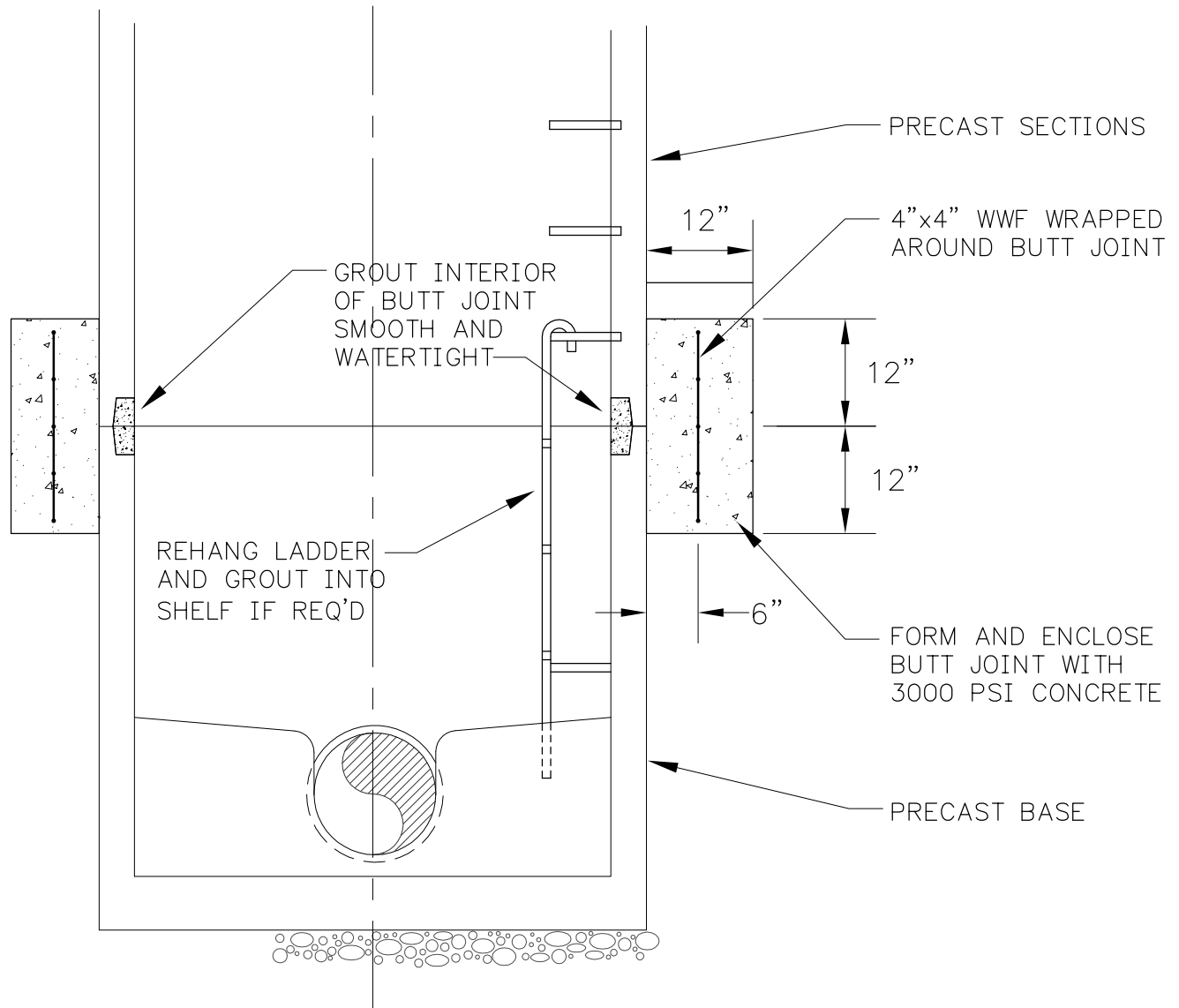


CLASS F FLEXIBLE PIPE BEDDING



NOTES:

1. FOUNDATION GRAVEL OR GRAVEL BEDDING MAY BE SUBSTITUTED AT CONTRACTORS OPTION WITH NO ADDITIONAL COST TO THE OWNER.
2. REMOVE UNSUITABLE MATERIAL TO FIRM FOUNDATION AND REPLACE WITH FOUNDATION GRAVEL WHERE REQUIRED.
3. "W"=40" FOR RIGID PIPE 15" OR LESS IN DIAMETER, "W"=1.5 INTERNAL DIAMETERS PLUS 18" FOR RIGID PIPE 15" OR LARGER IN DIAMETER.
4. "W"=6 PIPE DIAMETERS FOR FLEXIBLE PIPE.
5. TICKETS NOT REQUIRED, QUANTITIES TO BE COMPUTED TO NEAT LINES SHOWN.



NOTES:

1. REQUIRES SPECIAL PERMISSION AND INSPECTION BY RWD
2. NO WALL PENETRATIONS ALLOWED IN THE BUTT JOINT AREA
3. PRECAST SECTION BUTT JOINT AREA MUST BE CLEAN AND UNBROKEN

15 **MANHOLE BUTT JOINT**

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* * * END OF DIVISION ONE INDEX * * *

SECTION 01001

SPECIFICATION STRUCTURE

1. GENERAL

1.1 FORMAT

- A. This specification is organized on the format promulgated by the Construction Specification Institute (CSI format).
- B. This format assigns permanent numbers to all Divisions and Sections and so far as possible assigns permanent places to all products, processes, activities and construction requirements in the specifications. A number is assigned which will not change from specification to specification.
- C. Division, Section and Subsection numbers which are not required are omitted from the Specification.
- D. Reference to an Article is a numbered clause in the General Conditions.

1.2 INDEX

- A. All Sections required for a complete Contract appear in the index. Sections that are not required are omitted.
- B. Bidders and Contractors should check Sections present against the index to ensure the presence of all required Sections of the Contract.

1.3 ARRANGEMENT

- A. The Project Manual is organized as follows:
 - 1. Procedural and legal documents are in the opening Sections.
 - 2. Specifications are in Divisions numbered 1 to 16.
- B. No attempt has been made in these specifications or plans to segregate work covered by any trade or subcontractor under one specification. Such segregation and establishment of subcontract limits shall be solely a matter of specific agreement between the Contractor and his subcontractors and shall not be based upon an inclusion, segregation or arrangement in or of these specifications. The Contractor and subcontractor in each case is warned that work included in any subcontract may be divided between several general specifications and that each general specification or subhead of the Technical Specifications may include work covered by two or more subcontracts in excess of any one subcontract.
- C. The Contractor shall be responsible for all work shown or specified, regardless of location in the Contract Documents.

1.4 LANGUAGE

- A. These Specifications are written in imperative and abbreviated form.
- B. This imperative language of the technical sections is directed at the Contractor, unless specifically noted otherwise.
- C. Incomplete sentences shall be completed by inserting "shall", "the Contractor shall", and "shall be", and similar mandatory phrases by inference in the same manner as they are applied to notes on the drawings. The words "shall be" shall be supplied by inference where a colon (:) is used within sentences or phrases.
- D. Except as worded to the contrary, fulfill (perform) all indicated requirements whether stated imperatively or otherwise.

* * * END OF SECTION * * *

SECTION 01043

JOB SITE ADMINISTRATION

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Supervision: Section 00700 Article 12, General Conditions
- B. Inspection Services: Section 01420
- C. Temporary Water: Section 01515
- D. Protection of Work and Property: Section 01545
- E. Traffic Regulation: Section 01570

1.2 REMOVAL OF DEBRIS, CLEANING, ETC.

- A. The Contractor shall at all times keep the construction area clean and orderly and upon completion of the work shall leave all buildings broom clean and all parts of the work clean and free of rubbish or excess material of any kind.
- B. Windows, doors, hardware, woodwork, fixtures, equipment, walls and floors shall be left clean and free of stains, paint or roofing splashes or other marks or defects.
- C. Upon completion, the site of all work or equipment and material storage areas shall be restored to substantially their original condition.
- D. Miscellaneous debris, rocks, etc., resulting from the work shall be removed and disposed of in a manner satisfactory to the Owner.
- E. The site shall be left in a clean and neat condition.

1.3 TESTS

- A. Where the Specifications require work to be specifically tested or reviewed, it shall not be tested or covered up without timely notice to the Engineer of its readiness for inspection, unless the Engineer waives such notice.
- B. Should any such work be covered up without such notice, approval or consent, it must, if required by the Engineer, be uncovered for examination at the Contractor's expense.
- C. Where work is to be tested, all necessary equipment shall be set up and the work given a preliminary test so that any and all defects may be discovered and repaired prior to calling out the Engineer for the test.

1.4 OWNER MAY DETERMINE PRECEDENCE

- A. Whenever, in his opinion, it is necessary to do so, in order to ensure proper completion of the Contract for construction and installation, the Owner shall determine the order of precedence and the time and season at which any portion or portions of the work shall be commenced and carried on.
- B. The Owner may schedule a sequence of the work when it is in locations where the Owner is doing other work by his own forces, or by other contract, or when other work may be affected by work under this Contract, in order that conflict may be avoided and the work under these Specifications be coordinated with that under other contracts or with other work being done in connection with or growing out of operations of the Owner.
- C. Nothing herein contained shall be taken to relieve the Contractor of any of his obligations or liabilities under this Contract.

1.5 COMMENCEMENT OF WORK ON PUBLIC AND PRIVATE RIGHT-OF-WAY

- A. Work shall not be started on any public or private right-of-way until clearance is given the Contractor by the Engineer.
- B. It will be the responsibility of the Contractor to comply with any special requirements of any permits or easements for the project acquired by the Owner.

* * * END OF SECTION * * *

SECTION 01045 CUTTING AND PATCHING

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Demolition: Section 02050
- B. Pavement Repair and Resurfacing: Section 02575

1.2 METHODS

- A. Execute cutting (including excavating), fitting or patching of work, required to:
 - 1. Make several parts fit properly.
 - 2. Remove and replace defective work.
 - 3. Remove and replace work not conforming to requirements of Contract Documents.
 - 4. Install specified work in existing construction.
- B. Do not endanger any work by cutting or altering work or any part of it.
- C. Do not cut or alter work of another contractor.

1.3 SUBMITTALS

- A. Submit written notice to Engineer requesting consent to proceed prior to cutting which affects structural safety of project, or work of another contractor.
- B. Submit notice to Engineer, designating time work will be uncovered, to provide for observation.

1.4 PAYMENT FOR COSTS

- A. Contractor shall pay for all costs caused by ill-timed, unnecessary or defective work or work not conforming to Contract Documents, including costs for additional services of Engineer.

2. PRODUCTS

2.1 MATERIALS

- A. For replacement of work removed: Contractor shall comply with Specifications for type of work to be done.

3. EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions of work, including elements subject to movement or damage during construction.

3.2 PREPARATION (PRIOR TO CUTTING)

- A. Provide shoring, bracing and support as required to maintain structural integrity of all portions of the project.

3.3 PERFORMANCE

- A. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances, and finishes.
- B. Execute excavating and backfilling as specified in Section 02222.
- C. Restore work which has been cut or removed.

* * * END OF SECTION * * *

SECTION 01070

ABBREVIATIONS AND SYMBOLS

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Definitions: Section 00700 General Conditions

1.2 ABBREVIATIONS

- A. Whenever the following abbreviations are used on the plans, specifications, proposals and contracts, they shall be construed to mean the words and terms as listed below.
- B. Duplicate Definitions shall be interpreted in context of use.

A

AASHTO	American Association of State Highway and Transportation Officials
AC	Asbestos Cement or Asphaltic Concrete
ACI	American Concrete Institute
AFBMA	Anti Friction Bearing Manufacturers Association
AFF	Above Finish Floor
AGA	American Gas Association
AGC	Associated General Contractors of America
AGMA	American Gear Manufacturer Association
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANPT	American National Taper Pipe (pipe thread).
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ASAE	American Society of Agriculture Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association

B

BTU	British thermal unit
BTUH	British thermal units per hour

C

C	Centigrade/Celsius
CB	Catch Basin
CBMA	Certified Ballast Manufacturers Association
CFM	Cubic feet per minute
CFS	Cubic feet per second
CL ²	Chlorine Solution
CMP	Corrugated Metal Pipe
CO	Clean Out
CPM	Critical path method

CRSI	Concrete Reinforcing Steel Institute
<u>D</u>	
D	Drain
dBA	Decibel Filter A
DFP	Douglas Fir Plywood Association
DFT	Dry Film Thickness
DI	Ductile Iron
DIPRA	Ductile Iron Pipe Research Association
<u>E</u>	
EA	Each
EEO	Equal Employment Opportunity
E/P	Edge of Pavement
EPA	Environmental Protection Agency (Federal)
<u>F</u>	
F	Fahrenheit
FCA	Flanged Coupling Adapter
FED SPEC	Federal Specification
FHWA	Federal Highway Administration
FL	Flanged
FPM	Feet per minute
FRP	Fiberglass Reinforced Plastic
FT,FT ² ,FT ³	Foot, square feet, cubic feet
<u>G</u>	
GA	Gage, gauge
GAL	Gallon
GALV	Galvanized
GCE	Grit Chamber Effluent
GPD	Gallons per day
GPH	Gallons per hour
GPM	Gallons per minute
<u>H</u>	
HB	Hose Bib
HDPE	High Density Polyethylene
HOA	Hand-Off-Auto
HP	Horsepower or High Point
HR	Hour
HT	Height
Hz	Hertz
<u>I</u>	
ID	Inside Diameter
IE	Invert Elevation
IEEE	Institute of Electrical and Electronics Engineers
IN,IN ² ,IN ³	Inch, square inches, cubic inches
IPCEA	Insulated Power Cable Engineers Association
IPS	Iron Pipe Size
ISA	Instrument Society of America
<u>J</u>	
JIC	Joint Industry Conference of Hydraulic Manufacturers
<u>K</u>	
KV	Kilovolt
KVA	Kilovolt ampere

KVAR	Reactive kilovolt amperes
KW	Kilowatts
KWH	Kilowatt hours
<u>L</u>	
L	Length
LB	Pounds
LF	Linear feet
LS	Lump Sum
<u>M</u>	
M	Thousand
MA	Milliamperes
MBTUH	One thousand British thermal units per hour
MGD	Million gallons per day
mg/l	Milligrams per liter
MIN	Minute
MJ	Mechanical Joint
ML	Mixed Liquor
MSDS	Material Safety Data Sheets
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
MV	Millivolts
MVA	Megavolt amperes
<u>N</u>	
NAAPI	North American Association of Pipeline Inspectors
NAMM	National Association of Metal Manufacturers
NBFU	National Bureau of Fire Underwriters
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
NPC	National Plumbing Code
NPT	National pipe thread
NRS	Non-rising stem
NLMA	National Lumber Manufacturers Association
<u>O</u>	
o.c.	On Center
OD	Outside diameter
OECI	Overhead Electric Crane Institute
OSHA	Occupational Safety and Health Act
OZ	Ounce
<u>P</u>	
PACP	Pipe Assessment Certification Program
PCA	Portland Cement Association
PCF	Parts per Cubic Foot
PD	Pitch Diameter
pH	Hydrogen ion concentration
PH	Phase
PPM	Parts per million
PSF	Pounds per square foot
PSI	Pounds per square inch
PSIG	Pounds per square inch gauge
PT	Pint
PVC	Polyvinyl chloride

Q

R

RAS Return Activated Sludge
RCW Revised Code of Washington
RPM Revolutions per minute

S

S Slip
SAE Society of Automotive Engineers
SAMA Scientific Apparatus Manufacturers Association
Sc Scum
SCFM Standard cubic feet per minute
SE Secondary Effluent
SMACNA Sheet Metal and Air Conditioning Contractors National Association
SP Static Pressure
SPDT Single Pole Double Throw
SQFT Square foot
SQIN Square inch
SQMI Square mile
SSPC Steel Structures Painting Council
SW Service Water (Effluent)

T

TEFC Totally Enclosed, Fan Cooled
THD Threaded
TOW Top of Wall

U

UBC Uniform Building Code
UHMW Ultra-High Molecular Weight
UL Underwriter's Laboratory
UPC Uniform Plumbing Code
USEPA United States Environmental Protection Agency

V

V Volt
VOC Volatile Organic Compound

W

W Plant Water
WAC Washington Administrative Code
WAS Waste Activated Sludge
WCLIB West Coast Lumber Inspection Bureau
WOG Water, Oil, Gas
WWF Welded Wire Fabric
WWPA Western Wood Products Association

X

Y

Z

* * * END OF SECTION * * *

SECTION 01210

PRECONSTRUCTION CONFERENCES

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Job Site Administration: Section 01043
- B. Shop Drawings, Project Data and Samples: Section 01340
- C. Traffic Regulation: Section 01570
- D. Material and Equipment: Section 01600

1.2 SCHEDULE

- A. Not more than five days after notice to proceed but earlier if practicable, the Owner will schedule a preconstruction meeting.
- B. Present at the meeting to represent the Contractor shall be at least the official in charge of the project, the project superintendent, a representative with authority to speak for each of his principle subcontractors, and other representatives as he may deem expedient.
- C. The Owner and/or his representatives shall be present as required.
- D. Proceedings of meeting to be recorded and distributed to interested parties.

1.3 AGENDA

- A. Both Owner and Contractor shall be prepared to speak to the following:
 - 1. Name and field address of job superintendent.
 - 2. Emergency phone and/or operator.
 - 3. Date of Construction Start.
 - 4. Date of Notice to Proceed.
 - 5. Notification of utilities concerned, fire, police, schools, etc.
 - 6. Coordination with other contractors.
 - 7. Permits: county, city, state fisheries, government agencies as required.
 - 8. Inspector: name, authority.
 - 9. Field office (location).
 - 10. Shop Drawing Submittals.
 - 11. Responsibility for lines and grades.
 - 12. Minimum wage rates and posting of wage rate determination.
 - 13. Equal employment opportunities and posting of EEO poster. Use of local labor.
 - 14. Weekly payrolls when required.
 - 15. Schedule of Values.
 - 16. Periodic monthly payments including date for submittal.
 - 17. Construction progress schedule (bar graph or C.P.M.).
 - 18. Safety Requirements and special hazards.
 - 19. Insurance and Bonds.
 - 20. Traffic control.
 - 21. Construction signs.
 - 22. Drawings revised to conform to construction records.
 - 23. Beneficial occupancy.
 - 24. Retention of Contract records.
 - 25. Guarantees and warranties.
 - 26. Operation and Maintenance Manuals.
 - 27. Nondiscrimination Notice.
 - 28. Project signs.
 - 29. Testing.
 - 30. Progress meetings.
 - 31. Complaint procedure.
 - 32. Job photos.

33. Other matters concerning construction.

* * * END OF SECTION * * *

SECTION 01340

SHOP DRAWINGS, PROJECT DATA AND SAMPLES

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Job Site Administration: Section 01043
- B. Testing Laboratory Services: Section 01410
- C. Project Record Documents: Section 01720

1.2 SCHEDULE

- A. Prepare and submit with Construction Schedule a separate schedule listing dates for submission and dates that reviewed shop drawings, project data and samples will be needed.
- B. Fabrication of an item or construction work shall not start before the Engineer has taken action on the shop drawing submittal. Any work shall be entirely at the Contractor's risk.
- C. The Engineer will not accept for payment work performed by the Contractor which may be affected by materials, equipment, or methods of work not submitted in a timely manner so that final review can be accomplished before the affected work is complete.
- D. Incomplete shop drawings or submittal rejected by the Engineer shall not be basis for claim for delay.

1.3 SUBMITTALS

- A. Shop Drawings, data and samples shall be submitted attached to a form furnished by the Engineer entitled "Shop Drawing Transmittal". Location by drawing number and paragraph of specification shall be shown on the form for the product or material being submitted. Each transmittal shall be assigned a unique number in sequential order.
- B. Shop drawings shall be submitted and reviewed in the following manner:
 - 1. The Contractor shall review, stamp with his approval and submit postpaid with such promptness as to cause no delay in his work or in that of any other contractor, the required number of copies of all shop drawings, schedules, data, and samples required for the work of the various trades determined necessary by the Engineer, required in the General Conditions and/or described elsewhere in the Project Manual.
 - 2. Shop drawings shall establish the actual detail of all manufactured or fabricated items. All shall be drawn to scale and be completely dimensioned.
 - 3. Sheet sizes of shop drawings shall be in multiples of 8-1/2 by 11 inches and not exceeding 22 by 34 inches unless there is a special requirement for larger size sheets.
 - 4. Provide on each drawing a clear space for the Engineer's and/or Owner's review and approval stamps and comments.
 - 5. Four (4) copies of shop drawings, manufacturer's literature, brochures, catalog cuts, and other pertinent printed matter or data shall be submitted in addition to the number of copies the Contractor wishes returned to him.
 - 6. Shop drawings may be submitted to the Engineer in the form of a reproducible transparency, along with one blackline or blue-line print.
 - 7. The Engineer shall review the shop drawings with reasonable promptness and will affix the Shop Drawing Review Stamp with notations thereon indicating "No Exceptions Taken", "Make Corrections Noted", "Revise and Resubmit", or "Rejected -- See Remarks". He will then obtain the prints he requires from the transparency and forward it along with one marked up copy and the reviewed copies of the other material in excess of four to the Contractor.

8. When shop drawings and/or other submittals are required to be revised or corrected and resubmitted, the Contractor shall make such revisions and/or corrections and resubmit the drawings or other material in the same manner as specified above.
 9. Contractor shall obtain and provide such number of prints or copies of drawings as is required for his field distribution.
 10. It shall be the Contractor's responsibility to clearly note on the shop drawings, and in writing specifically call to the Engineer's attention, any changes that vary from the Contract Drawings and Specifications. No review of the shop drawings by the Engineer shall relieve the Contractor of full responsibility and at his own cost and expense to comply with the Contract Documents unless the changes are clearly noted and in writing called to the Engineer's attention as above provided, in which event subsequent acceptance by the Engineer in writing shall be authority for the change or changes proposed in the shop drawings.
 11. If corrections are required, the Contractor shall make the corrections required by the Engineer and file with him the same number of corrected copies as indicated above. The Contractor shall direct specific attention in writing or, on resubmitted Shop Drawings to revisions other than the corrections requested on previous submissions. The Engineer will return to the Contractor copies of drawings in the same manner and number as before.
 12. Shop Drawings shall give complete information necessary for the fabrication and installation of all component parts of the equipment, structure, facility, etc. In the case of structural drawings, they shall include the location, type, size and extent of all welds, if any are necessary. Manufacturer's standard details, catalogues, advertising literature, etc., shall not necessarily constitute all of the shop drawings required for any unit or facility. Additional shop details designed for the particular project shall be furnished when required by the Engineer. Shop drawings of electrical equipment shall include complete diagrams of electrical circuitry.
 13. The Engineer's review of and placement of shop drawing review stamp on any shop drawing is understood to be an acceptance of the character of the details and not a check of any dimension or quantity and will not relieve the Contractor from responsibility for errors of any sort in shop drawings data or schedules, whether or not such errors are found by the Engineer in his review of such details.
 14. The Engineer's review of and placement of Shop Drawing Review Stamp on any shop drawing will not relieve the Contractor of responsibility for consequences due to deviations from the Contract Documents unless the Contractor has called attention to such deviations in writing by a letter accompanying the drawings at the time of submission and the Engineer accepts such deviations in writing.
 15. No changes will be made in any drawing after it has been reviewed except by the consent or direction of the Engineer in writing.
- C. Samples shall be submitted in the same manner as shop drawings.
1. Samples to be physical examples to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged.
 - a. Office samples of sufficient size and quantity to clearly illustrate:
 - i. Functional characteristics of product or material, with integrally related parts and attachment devices.
 - ii. Full range of color samples.
 - iii. After review the Engineer will retain two samples and return the remainder to the Contractor.

- b. Field samples and mockups
 - i. Erect at project site location acceptable to Engineer
 - ii. Construct each required sample or mock-up complete, including work of all trades required in finished work.
 - iii. Coordinate sampling of natural materials with Field Engineer.
- 2. If any test sample fails to meet the specification requirements, all previous approvals will be withdrawn and such materials or equipment, which fail the testing, shall be subject to removal and replacement by the Contractor with materials or equipment meeting the specification requirements.
- 3. Affected finish work shall not be commenced until the Engineer has given written approval for the field samples.

1.4 CONTRACTOR RESPONSIBILITY

- A. Contractor shall review and approve shop drawings before submittal. Submittal directly from supplier or subcontractor will not be accepted.
- B. By approving and submitting Shop Drawings and Samples, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the requirements of the Work and of the Contract Documents and that there is no conflict with other submittals that may affect the work of another contractor or the Owner.
- C. A copy of each approved shop drawing and each approved sample shall be kept in good order by the Contractor at the job site and shall be available to the Engineer.

1.5 LIMITATION

- A. Two submittals of each item requiring samples and/or shop drawings will be reviewed by the Engineer in the regular course of the Contract. However, all subsequent reviews of the same item over two will be reviewed at the expense of the Contractor unless the right to an additional review without charge was previously approved in writing by the Engineer. Contractor will be billed by the Owner at the Engineer's current established rates.

* * * END OF SECTION * * *

SECTION 01410

TESTING LABORATORY SERVICES

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Testing Requirements: Various Sections

1.2 BIOLOGICAL TESTING

- A. Biological tests required for disinfection of domestic water systems shall be by a laboratory approved by the Health Department or other authority having jurisdiction.

1.3 CONTRACTOR WILL PAY FOR SERVICES OF AN INDEPENDENT TESTING LABORATORY FOR:

- A. Soils gradation, moisture density standards determination, and in place density tests per Division 2.
- B. Other materials and/or workmanship specified in Divisions 2.

1.4 LIMITATION

- A. Employment of a testing laboratory shall in no way relieve the Contractor of his obligation to perform work in accordance with the Contract.

1.5 QUALIFICATION OF LABORATORY

- A. Meet basic requirements of ASTM E329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction".
- B. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection; with memorandum of remedies of any deficiencies reported by inspection.
- C. Testing Equipment:
 - 1. Calibrated at maximum 12 month intervals by devices of accuracy traceable to National Bureau of Standards.
 - 2. Submit copy of certificate of calibration, made by accredited calibration agency.

1.6 LABORATORY DUTIES, AUTHORITY AND LIMITATION

- A. Cooperate with Engineer and Contractor.
- B. Provide qualified personnel promptly on notice.
- C. Perform specified inspections, sampling and testing of materials and methods of construction:
 - 1. Comply with specified standards; ASTM, other recognized authorities, and as specified.
 - 2. Ascertain compliance with requirements of Contract Documents.
- D. Promptly notify Engineer, and Contractor, of irregularities or deficiencies of work which are observed during performance of services.
- E. Promptly submit 2 copies of report of inspections and tests to Engineer, in addition to those required by the Contractor including:
 - 1. Date issued
 - 2. Project title and number
 - 3. Testing Laboratory name and address
 - 4. Name and signature of Inspector
 - 5. Date of inspection of sampling
 - 6. Record of temperature and weather
 - 7. Date of test
 - 8. Identification of product and specification section
 - 9. Location in project
 - 10. Type of inspection or test
 - 11. Results of test

- 12. Observations regarding compliance with Contract Documents
 - F. Perform additional services as required.
 - G. Laboratory is not authorized to:
 - 1. Release, revoke, alter, or enlarge on, requirements of Contract Documents.
 - 2. Approve or accept any portion of work.
- 1.7 RESPONSIBILITIES OF CONTRACTOR
- A. Cooperate with laboratory personnel and provide access to work.
 - B. Provide to laboratory, preliminary representative samples of materials to be tested in required quantities.
 - C. Furnish copies of mill test reports.
 - D. Furnish casual labor and facilities:
 - 1. To provide access to work to be tested.
 - 2. To assist laboratory personnel to obtain and handle samples at the site.
 - 3. To facilitate inspections and tests.
 - 4. For laboratory's exclusive use for storage and curing of test samples.
 - E. Notify laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
 - F. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory or agency, the sample or samples of materials to be tested shall be selected by such laboratory or agency, or the Engineer, and shipped to the laboratory by the Contractor at his expense.
- * * * END OF SECTION * * *

SECTION 01420 INSPECTION SERVICES

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Status of Engineer: Section 00700 Article 7 General Conditions
- B. Overtime and Holiday Work: Section 00700 Article 15 General Conditions
- C. Rejected Work/Re-inspection: Section 00700 Article 16 General Conditions
- D. Re-inspection: Section 00700 Article 16 General Conditions
- E. Utilization of Defective Work: Section 00700 Article 16 General Conditions
- F. Job Site Administration: Section 01043
- G. Testing Laboratory Services: Section 01410

1.2 AUTHORITY AND DUTIES OF INSPECTORS

- A. Inspectors are placed on the work to keep the Project Engineer informed as to the progress of the work and the manner in which it is being done; to keep records; act as liaison between the Contractor and the Project Engineer; also to call the attention of the Contractor to any deviations from the Contract Documents, but failure of the Inspector to call to the attention of the Contractor to faulty work or deviations from the Contract Documents shall not constitute acceptance of said work.
- B. The Inspector may reject or accept materials and equipment to be incorporated in the work and such specific items as he is authorized by the Engineer to accept.
- C. When any material has been accepted by the Inspector, it passes from his control to the control of the Contractor and remains there until the job, as a whole, is complete. Since the Inspector cannot control how the material is used, the responsibility for its safety and proper use will be the Contractor's. Until the job is finally completed, the Contractor might do work that changes or modifies work previously done and even though at any given time a piece of work might be well done and acceptable in quality, the responsibility for keeping it in that condition until the job is completed is the sole responsibility of the Contractor. For this reason, it is impossible to accept, finally, any portion of a project until the project as a whole is acceptable and control of said project is withdrawn from the Contractor by final official written acceptance by the Owner.
- D. Since one of the Inspector's primary interests is to see that work on the project progresses expediently and in a workmanlike manner, he may at various times offer suggestions to the Contractor which the Contractor may or may not follow, at his discretion. Such suggestions are never to be considered as anything but suggestions and involve no assumption of responsibility, financial or otherwise, by either the Inspector himself, the Engineer, or the Owner.
- E. Any personal assistance which an Inspector may give the Contractor will not be construed as the basis of any assumption of responsibility in any manner, financial or otherwise, by the Inspector, the Engineer, or the Owner.
- F. The Engineer is not and does not purport to be a Safety Engineer and is not engaged in that capacity by the Owner and shall have neither authority nor responsibility to enforce construction safety laws, rules, regulations, procedures or the safety of persons on and about the construction site.
- G. The presence or absence of an Inspector on any job will be at the sole discretion of the Engineer, and such presence, or absence, of an Inspector will not relieve the Contractor of his responsibility to obtain the construction results specified in the Contract Documents.
- H. The Inspector will not be authorized to approve or accept any portion of the work, to make changes in the work, or to issue instructions contrary to the Contract Docu-

ments, such approvals, acceptances, or instructions, when given, must be in writing and signed by the Project Engineer. The Inspector will have authority to reject defective material; however, the failure of the Inspector to reject defective material or any other work involving deviations from the Contract Documents will not constitute acceptance of such work.

- I. Nothing in this subsection shall in any way be so construed as to require or to place responsibility for, the method, manner or supervision of the performance of the work under this Contract upon the Inspector, the Engineer, or the Owner. Such responsibility rests solely with the Contractor.

1.3 EXAMINATION OF MATERIALS

- A. The neglect or failure on the part of the Engineer to condemn or reject substandard material or work shall not imply an acceptance of the materials or work. The Contractor shall furnish, at his own expense, such labor as may be required to enable the Engineer to make a thorough inspection and culling of the materials, and the Contractor shall bear the costs of all laboratory or other testing called for in these Specifications.
- B. Where required by the Specifications, the Engineer will examine certain materials such as masonry materials, concrete, aggregates, etc., at the manufacturer's plant prior to their delivery to the job site. The Contractor shall bear the cost of such material inspection including the Inspector's time, travel time and transportation expense and any other costs incurred, or chargeable to, or by, such material inspection. These inspection costs shall be billed to the Contractor at the Engineer's current billing rate. Transportation expense shall be billed at current rate. All such material inspection charges will be billed directly to the Contractor by the Owner and said costs shall be a lien against the Contractor's work. If the Contractor fails to pay said bill, or bills, by the 30th day of the month billed, such payment may be withheld from monies due the Contractor.

* * * END OF SECTION * * *

SECTION 01515 TEMPORARY WATER

1. GENERAL

1.1 DESCRIPTION OF SYSTEM

- A. The Contractor shall make arrangements for and provide all necessary facilities for water supply at his own expense, unless otherwise provided.

1.2 COSTS

- A. Costs of temporary water services shall include, but not be limited to, all cost of installations, maintenance and removal of facilities.
- B. If the Owner is a water purveyor, water for filling, testing and flushing of the new pipelines will be available from the existing water distribution system at no cost to the Contractor after obtaining prior permission from the Owner.
- C. If the Owner is not a water purveyor, the Contractor may secure water from any suitable source. If the Contractor purchases water from a water utility at a fire hydrant on or near the project, all arrangements shall be made by him at his own expense and payment be made to the utility in accordance with their rate schedule.

2. PRODUCTS

2.1 MATERIALS

- A. Materials may be new or used but must be adequate for purpose required, sanitary and must not violate requirements of applicable codes.

3. EXECUTION

3.1 GENERAL REQUIREMENTS

- A. The water utility shall be contacted to determine if sufficient water is available at the particular time before any use.
- B. Flushing overnight or excessive wasting will not be permitted.
- C. The Contractor shall use only those hydrants designated by the agency in charge of water distribution and in strict accordance with its requirements for hydrant use.
- D. The Contractor shall use hydrant wrenches only in open hydrants. He shall also make certain that the hydrant valve is open "full", since "cracking" the valve causes damage in the valve. An approved auxiliary valve shall be provided on the outlet line for control purposes. Fire hydrant valves must be closed slowly to avoid a surge in the system which creates undue pressure on the water lines. The Contractor shall carefully note the importance of following these directions.
- E. If one of the Contractor's employees shall knowingly or unknowingly use the wrong wrench on a hydrant and thereby damage the hydrant valve stem, the Contractor will be responsible. He shall immediately notify the water utility so that the damage can be repaired as quickly as possible.
- F. Upon completing the use of the hydrants, the Contractor shall notify the water distribution agency, so that the hydrants may then be inspected for possible damage. Any damage resulting from the use of the hydrants by the Contractor will be repaired by the water agency and the cost thereof shall, if necessary, be withheld from the final payment to the Contractor.
- G. The Contractor shall furnish all connectors, wrenches, valves, and small tools that may be necessary to meet the requirements of the water distribution agency pertaining to hydrant use.
- H. Violation of these requirements will result in fines and will lay the Contractor liable for damage suits because of malfunctioning of damaged fire hydrants, in the event of fire or other emergencies.

3.2 REMOVAL

- A. Completely remove temporary materials and equipment upon completion of construction.

* * * END OF SECTION * * *

SECTION 01545

PROTECTION OF WORK AND PROPERTY

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Protection of Work, Property and Persons: Article 11 General Conditions
- B. Property Restoration: Article 24 General Conditions
- C. Land and Right-of-Way: Article 28 General Conditions
- D. Access and Haul Roads: Section 01550
- E. Temporary Controls: Section 01560
- F. Pavement Repair and Resurfacing: Section 02575
- G. Existing Utilities/Facilities - Underground and Overhead: Section 02760
- H. Landscape Restoration: Section 02990

1.2 PUBLIC AND PRIVATE PROPERTY

- A. The Contractor shall protect and maintain all underground or above-ground utilities and structures affected by the work and all lawns, shrubs, trees, fences, rockeries, etc., and parking strips or private property crossed by or adjacent to his operation, and any damage shall be repaired and restored by the Contractor to the satisfaction of the Owner.
- B. The Contractor will be responsible for all damage to roads, highways, ditches, bulkheads, walls, bridges, culverts, utilities, barricades, lights, or other property, caused by the work, whether such damage be at the site of the work or caused by transporting or hauling to or from the work; and he shall repair or replace, or arrange for the repair or replacement of all such damage to the satisfaction of the Owner. Any material damaged by the Contractor's operations shall be replaced with new material.
- C. Whenever construction work under this Contract is undertaken on easement, right-of-way, or franchise, all work shall be confined to the limits of such easement, right-of-way, or franchise, and accomplished so as to cause the least amount of disturbance and a minimum amount of damage.
- D. Completion of work across private property shall be carried out in one continuous operation of construction of the facilities with the immediate restoration and cleanup of the construction area. If the Contractor fails to perform such construction and restoration continuously as herein provided, the Owner may give the Contractor a written notice to so perform, and in event of failure by the Contractor to complete such construction and restoration within 72 hours of such notice, the Owner may complete the installation and restoration on such private property to the extent the Owner deems advisable and the cost of all work, labor, materials, and expenses incurred by the Owner in so doing shall be paid by the Owner and may be deducted from any monies due or to become due, the Contractor.
- E. Particular care shall be exercised to see that the topsoil from the trench is preserved and replaced in its original location. It shall be the Contractor's responsibility to strip such topsoil from the trench, or construction area, and stockpile it in such a manner that it may be replaced, by him, upon completion of construction.
- F. Wherever it may be necessary for the Contractor to trench through any lawn areas, the sod shall be carefully cut and rolled and replaced after ditches have properly compacted. All work shall be done in a manner calculated to leave the lawn area clean of earth and debris and in a condition as near as possible to that which existed before work was started.
- G. The Contractor shall not remove, even temporarily, any trees or shrubs which exist on easements across private property or in parking strips, without first having notified the property owners or authorities maintaining same.

- H. Ornamental trees and shrubbery shall be carefully removed with the earth surrounding their roots, wrapped in burlap and replanted in their original positions within 48 hours. Ornamental trees or shrubbery destroyed, or damaged, by the Contractor, whether on public or private property shall be replaced by the Contractor with material of equal quality, and no additional compensation will be allowed for such replacement.
- I. It is expressly understood that the Contractor shall in particular restore all such easements and right-of-way to a condition equal to its original condition and in a condition satisfactory to the property owners and the Owner. It is also understood that any private improvements made in public right-of-way are included in the above category.
- J. All property owners affected by work including upstream, downstream, or adjacent connections, shall be notified before starting work.

1.3 TREES

- A. All existing trees and shrubs which are to be protected and are damaged during construction shall be trimmed or replaced by the Contractor or a certified tree company under permit from the jurisdictional agency or owner and to the satisfaction of said agency and/or owner.
- B. The Contractor shall immediately notify the Engineer and/or Developer if any tree which is to be protected is damaged by his operations. If, in the opinion of said agency or the owner, the damage is such that replacement is necessary, the Contractor shall replace the tree at his own expense.
- C. Replacement trees shall be of a like size and variety as the tree damaged, or, if of a smaller size, the Contractor shall pay to the owner of said tree a compensatory payment acceptable to the tree owner not to exceed the cost of replacing the tree as determined from quotes obtained by the tree owner from a minimum of two local nurseries. The size of the replacement trees shall be not less than 1-inch diameter nor less than 6 feet in height.
- D. When trimming is permitted, symmetry of the tree shall be preserved. No stubs or splits or torn branches shall be left. Clean cuts shall be made close to trunk or large branch. Spikes shall not be used for climbing live trees. All cuts over 1-1/2 inches in diameter shall be coated with an asphaltic emulsion material.

1.4 RIGHTS-OF-ENTRY

- A. Rights-of-entry that have been or will be obtained by the Developer will be available for review by the Owner. A sample form is included in this Project Manual (see Section 00200). Additional rights-of-entry may be secured prior to the start of or during construction
- B. The Contractor shall not begin work on any property for which the Developer has not secured a right-of-entry. The Contractor shall meet and fulfill all covenants and stipulations of each right-of-entry obtained by the Developer for this project.
- C. Copies of all rights-of-entry will be on file in the office of the Owner, which is incorporated in the Contract by this reference, as if set forth herein in full.

1.5 ACQUISITION OF RIGHTS-OF-ENTRY

- A. The Developer has obtained or is in the process of obtaining the rights-of-entry required for this project
- B. If, at the time of Bids on this Contract, the Developer has not obtained all of the rights-of-entry, it is anticipated that there may be additional stipulations and covenants on the remaining rights-of-entry. All bidders shall base their bids upon pavement restoration and grading of all private property unless otherwise specifically stated.

1.6 COVENANTS ON RIGHTS-OF-ENTRY NOT LISTED

- A. Work shall not be started on any private property or right-of-way until clearance is given the Contractor by the Owner.

1.7 EASEMENTS

- A. Reference numbers of easements are shown on drawings.
- B. The Contractor shall meet and fulfill all covenants and stipulations of each easement obtained by the Developer for this project.
- C. Copies of all easements and special covenants are on file in the office of the Owner, which is incorporated in this Contract by this reference, as if set forth herein in full.

1.8 ACQUISITION OF EASEMENTS

- A. The Developer has obtained or is in the process of obtaining the easements required for this project.
- B. If at the time of Bids on this Contract, the Developer has not obtained all of the easements, it is anticipated that there may be additional stipulations and covenants on the remaining easements. It is also anticipated that the Developer may purchase certain items on easements, such as large trees within the permanent easement, thereby relieving the Contractor from the responsibility of restoring or protecting same. All bidders shall base their bids upon full restoration of all property within the easements unless otherwise specifically stated.

1.9 COVENANTS ON EASEMENTS NOT LISTED

- A. Work shall not be started on any private right-of-way or easement until clearance is given the Contractor by the Owner.

1.10 CARE OF EXISTING FACILITIES

- A. The Contractor shall take adequate precautions to protect existing sidewalks, curbs, pavements, utilities, adjoining property, and structures, and to avoid damage thereto, and he shall at his own expense completely repair any damage thereto caused by his operation.
- B. Access for firefighting equipment shall be maintained at all times.

1.11 SHORING, BRACING, ETC.

- A. The Contractor shall shore up, brace, under-pin, and protect as may be necessary, all foundations and other parts of all existing structures adjoining the site of the Project, which are in any way affected by the excavation or other operations connected with the completion of the work under this Contract.
- B. Whenever any notice is required to be given by the Developer or the Contractor to any adjoining or adjacent land owner or other party before commencement of any work under this Contract, such notice shall be given by the Contractor.
- C. The Contractor shall indemnify the Owner and save it harmless from any damages on account of settlements or the loss of lateral or subjacent support of adjoining property and from all loss or expense and all damages for which the Owner may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

1.12 EMERGENCIES

- A. Whenever the Contractor's work endangers the safety of life or property including adjoining property or property in the immediate proximity of the Project, the Contractor shall take all reasonable precautions to prevent threatened loss or injury there from.

1.13 EXISTING UTILITIES/FACILITIES - UNDERGROUND AND OVERHEAD

- A. The Contractor shall protect existing utilities/facilities, both overhead and underground as provided in Section 02760.

1.14 TEMPORARY FENCE

- A. The Contractor shall be responsible for the erection of temporary fence as required to protect his own work area.
- B. The Contractor shall be responsible for erection and maintenance of temporary fencing or other facilities as required retaining livestock and/or periodic security of existing fenced areas.
- C. Temporary fencing on facilities shall remain in place until the permanent fencing, as originally installed, is replaced under the restoration requirements of the Contract or as shown on the Contract Drawings.

* * * END OF SECTION * * *

SECTION 01550 ACCESS AND HAUL ROADS

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Land and Right-of-Way: Article 28 General Conditions
- B. Traffic Regulation: Section 01570

1.2 PRIVATE ACCESS

- A. Where required by the Contract or choice of the Contractor access may be over private land.
- B. Access will be maintained by and at the expense of the Contractor.
- C. Comply with local regulations and permits.
- D. Comply with all legal requirements to include as a minimum written permission of private owners.
- E. Control dust, noise and traffic, in compliance with local laws and regulations.
- F. Leave private property in condition satisfactory to the Owner and indicated by written release.

1.3 PUBLIC ACCESS AND HAUL ROADS

- A. Comply with all laws and regulations.
- B. All streets in the construction area used by Contractor's trucks or any other equipment hauling material to and from the area whether within the Contract limits or adjacent thereto shall be kept clean and shall be serviced by self-propelled pickup street sweepers to prevent the transport of sediment and other debris off the project site. Street sweepers shall be designed and operated to meet air quality standards.
- C. Street washing with water will require approval by the Engineer.
- D. Dust control shall continue until streets are accepted by the public agency responsible for maintenance or the Contractor is relieved of responsibility by such agency.
- E. Any damage to roadway surfaces from the direct or indirect result of the Contractor's operation shall be repaired by the Contractor to the satisfaction of the responsible agency.

* * * END OF SECTION * * *

SECTION 01560 TEMPORARY CONTROLS

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Land and Right-of-way: Article 28 General Conditions
- B. Job Site Administration: Section 01043
- C. Protection of Work and Property: Section 01545
- D. Access and Haul Roads: Section 01550
- E. Traffic Regulation: Section 01570
- F. Landscape Restoration: Section 02990

1.2 LAWS

- A. Requirements of federal, state and local statutes and regulations dealing with temporary controls described in this section shall be strictly adhered to by the Contractor.

1.3 CONSTRUCTION CLEANING

- A. The Contractor shall keep the site of the work and other areas used by him in a neat and clean condition, and free from any accumulation of rubbish.
- B. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the work site, and shall establish regular intervals of collection and disposal of such materials and waste.
- C. The Contractor shall keep his haul roads free from dirt, rubbish, and unnecessary obstructions resulting from his operations.
- D. Equipment and material storage shall be confined to areas approved by the Engineer.
- E. Disposal of all rubbish and surplus materials shall be off the site of construction, at the Contractor's expense, all in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws.

1.4 AIR POLLUTION CONTROL

- A. The Contractor shall not discharge smoke, dust or other contaminants into the atmosphere that violate the regulations of any legally constituted authority.
- B. The Contractor shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent his operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity.
- C. The Contractor shall comply with specific requirements of air quality control laws.
- D. The Contractor shall be responsible for any damage resulting from any dust originating from his operations.
- E. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Owner.

1.5 POLLUTION CONTROL

- A. Spill Prevention, Control and Countermeasures Plan
 - 1. The Contractor shall prepare a project-specific spill prevention, control and countermeasures (SPCC) plan to be used for the duration of the project. The plan shall be submitted to the Engineer prior to the commencement of any on site construction activities. The Contractor shall maintain a copy of the plan at the work site, including any necessary updates as the work progresses. If hazardous materials are encountered during construction, the Contractor shall do everything possible to control and contain the material until appropriate measures can be taken. Hazardous material, as referred to within this specification, is defined in

RCW 70.105.010 under "Hazardous Substances". Occupational safety and health requirements that pertain to SPCC planning are contained in WAC 296-155 and WAC 296-62. The SPCC plan shall address the following project-specific information.

2. SPCC Plan Elements
 - a. Site Information
 - i. Identify general site information useful in construction planning, recognizing potential sources of spills, and identifying personnel responsible for managing and implementing the plan.
 - b. Project Site Description
 - i. Identify staging, storage, maintenance, and refueling areas and their relationship to drainage pathways, waterways, and other sensitive areas. Specifically address:
 - 1) The Contractor's equipment maintenance, refueling, and cleaning activities
 - 2) The Contractor's on site storage areas for hazardous materials
 - c. Spill Prevention and Containment
 - i. Identify spill prevention and containment methods to be used at each of the locations identified in 2. b.i. above.
 - d. Spill Response
 - i. Outline spill response procedures including assessment of the hazard, securing spill response and personal protective equipment, containing and eliminating the spill source, and mitigation, removal and disposal of the material.
 - e. Standby, On-Site, Material and Equipment
 - i. The plan shall identify the equipment and materials the Contractor will maintain on site to carry out the preventive and responsive measures for the items listed.
 - f. Reporting
 - i. The plan shall list all federal, state and local agency telephone numbers the Contractor must notify in the event of a spill.
 - g. Program Management
 - i. Identify site security measures, inspection procedures and personnel training procedures as they relate to spill prevention, containment, response, management and cleanup.
 - h. Preexisting Contamination
 - i. If preexisting contamination in the project area is described elsewhere in the plans or specifications, the SPCC plan shall indicate measures the Contractor will take to conduct work without allowing release or further spreading of the materials.
 - i. Attachments
 - i. Site plan showing the locations identified in 2.b. and 2.c. noted previously.
 - ii. Spill and Incident Report Forms, if any, that the Contractor will be using.
 - j. Implementation Requirements
 - i. The Contractor shall be prepared and shall carry out the SPCC plan in the event of a hazardous spill within the project limits.
- B. All pollutants, including waste materials and demolition debris, that occur onsite shall be handled and disposed of in a manner that does not cause contamination of stormwater and is in accordance with the requirements of regulatory agencies. Good housekeeping and preventive measures shall be taken to ensure that the site will be kept clean, well organized, and free of debris.
- C. All vehicles, equipment, and petroleum product storage/dispensing areas will be

inspected regularly to detect any leaks or spills, and to identify maintenance needs to prevent leaks or spills.

1. On-site fueling tanks and petroleum product storage containers shall include secondary containment.
 2. Spill prevention measures, such as drip pans, will be used when conducting maintenance and repair of vehicles or equipment.
 3. In order to perform emergency repairs on site, temporary plastic will be placed beneath and, if raining, over the vehicle.
 4. Contaminated surfaces shall be cleaned immediately following any discharge or spill incident.
- D. Chemical storage and use:
1. All chemicals stored on the construction site shall have cover, containment, and protection.
 2. Application of agricultural chemicals, including fertilizers and pesticides, shall be conducted in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Manufacturers' recommendations for application procedures and rates shall be followed.
- E. Process water and slurry resulting from concrete work, grouting, sawcutting and surfacing operations shall be prevented from entering any stormwater system. It shall be disposed of in a manner that does not violate groundwater or surface water quality standards.

1.6 EROSION CONTROL

- A. Contractor shall provide temporary erosion control work shown in the plans, required by state or local agencies during the life of the contract. This work is intended to provide prevention, control, and abatement of water pollution/erosion within the limits of the project, and to minimize damage to the work, adjacent property, streams, and other bodies of water.
- B. The Contractor shall coordinate this temporary water pollution/erosion control work with the permanent drainage and erosion control work that may be specified in the Contract to the extent practicable to ensure that effective and continuous water pollution/erosion control is maintained during the construction of the Project.
- C. Clearing and grubbing operations shall be so scheduled and performed that grading operations and permanent erosion control features can follow immediately. If the project conditions do not permit this scheduling, temporary water pollution/erosion control measures will be required between successive construction stages.
- D. The area of excavation, borrow, and embankment operations in progress will be limited commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other permanent erosion control measures current according to the accepted schedule.
- E. If the Engineer determines that water pollution and/or erosion could occur due to seasonal limitations, the nature of the material, or the Contractor's progress, temporary water pollution/erosion control measures shall be taken immediately.
- F. The Engineer may require the Contractor's operations to be scheduled so that permanent erosion control features will be installed concurrently with or immediately following grading operations.
- G. Compliance with the requirements of this section shall not relieve the Contractor from his responsibility to comply with other provisions of the contract.

1.7 NOISE CONTROL

- A. Comply with state and local requirements as to allowable noise levels during construction.
- B. Equip all internal combustion engines in vehicles and construction equipment with effective mufflers.

- C. Prevent noise disturbance to adjoining property owners and the public.
- D. Construction operations shall be restricted to between the hours of 7:00 AM and 10:00 PM Monday through Friday without specific approval by the Owner except in emergencies.

1.8 SANITARY PROVISIONS

- A. The Contractor shall provide and maintain sanitary facilities for the use of his employees and the Engineer. The Contractor shall comply with the requirements and regulations of the agencies or organizations having jurisdiction over sanitary and health conditions and of other bodies or offices having jurisdiction thereover. He will permit no public nuisances.
- B. The Contractor shall establish a regular collection of all sanitary and organic wastes.
- C. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away from the site in a manner satisfactory to the Owner and in accordance with all laws and regulations pertaining thereto.

1.9 CHEMICALS

- A. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture.
- B. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

1.10 PROVISION FOR WATER COURSES

- A. The Contractor shall provide for the flow of all water courses, sewers or drains, intercepted or disturbed by the Contractor during the progress of the work, and shall replace the same in as good condition as he found them or shall make such final provisions for them as necessary.
- B. The Contractor shall not obstruct the gutter of any street, but shall use all proper measures to provide for the free passage of surface water.
- C. The Contractor shall make provisions to take care of all surplus water, mud, silt, or other runoff pumped from excavations or resulting from sluicing or other operations, and shall be responsible for any damage, of whatever nature, resulting from his failure so to provide.
- D. No direct payment shall be allowed for the above work. Payment for the cost thereof shall be included in the prices bid for the various items which comprise the improvement.
- E. All work adjacent to or in the vicinity of marine waters or fresh water courses shall be accomplished in accordance with the requirements of the Departments having jurisdiction.

1.11 FISHERIES PERMIT

- A. All construction work in the vicinity of existing creeks, rivers and lakes shall be subject to the provisions of state regulations.
- B. A copy of any applicable permit is available at the office of the Owner for examination by bidders.
- C. The Contractor shall conform to the requirements of the permits issued for this project.
- D. Each Contractor shall secure separate approval from the Department of Fish and Wildlife concerning his proposed construction methods, operation and scheduling which will affect the waterways or lakes, and shall conform to the requirements of these departments to preserve the aquatic resources. The authorized representatives of the Department of Fisheries shall be the sole judges as to the effect of the Contractor's operations on the aquatic life in the streams and

waterways.

- E. In the event said Department waives jurisdiction or does not approve the Contractor's method of operations, the Contractor shall secure written notice to that effect prior to construction.
- F. The Contractor may be held liable for any damage to fish life or habitat which results from failure to comply with the provisions of this section.

1.12 ARCHAEOLOGICAL OR CULTURAL RESOURCES

- A. The Contractor is advised that construction work within this Contract is subject to the provisions of state and federal laws and regulations pertaining to the preservation of archaeological and cultural resources.
- B. In the event that any archaeological or cultural resources are uncovered during the course of construction, all work shall cease until an inspection and evaluation of the site has been made by an archaeologist to insure that archaeological data are properly preserved. The Contractor shall notify the Owner who will in turn notify the proper authorities.
- C. The Contractor should anticipate reasonable delays while the archaeological investigations are being made and should make allowance for these delays under the appropriate bid items. No additional compensation will be allowed.

* * * END OF SECTION * * *

SECTION 01570 TRAFFIC REGULATION

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Protection of Work, Property and Persons: Article 11 General Conditions
- B. Land and Right-of-Way: Article 28 General Conditions
- C. Access and Haul Roads: Section 01550

1.2 MATERIALS AND CONTRACT

- A. Signs, warnings, light signals, bypass layouts, scheduling and routes shall conform to the requirements of U.S. Department of Transportation Federal Highway Administration "Manual on Uniform Traffic Control Devices", latest edition, as amended by local or state agency.

1.3 MAINTENANCE OF TRAFFIC

- A. The Contractor shall conduct his work so as to interfere as little as possible with public travel, and shall at his own expense provide and maintain suitable bridges, detours, or other temporary facilities for the accommodation of public or private travel including mail delivery, and shall give reasonable notice to the owners of private drives before interfering with them; provided, however, that such maintenance of traffic will not be required where the Contractor has obtained permission from the owners or tenants of private property, or the proper public authority, or both, to obstruct traffic within the said limits and time agreed upon.
- B. Access for firefighting equipment, police and ambulance services shall be provided at all times and the Contractor shall keep the local authorities informed at all times of the location of construction operations and fire lanes.
- C. The Contractor shall also notify the authorities in charge of any municipal, private, or school transportation systems at least 48 hours in advance, of road closures that will force a change in the regular routing of the transportation system. The Contractor shall also provide maintain suitable detour routes for the system.
- D. Highway and arterial crossings shall be made in such a way that no more than half of the roadway is closed to traffic at any time, except where suitable detours or other arrangements are agreed to by the agency having jurisdiction.

1.4 COMPLIANCE WITH LOCAL REQUIREMENTS

- A. The Contractor shall comply with all applicable state and local requirements for closure of streets.
- B. The Contractor shall provide barriers, guards, lights, signs, temporary bridges, flagmen and watchmen, advising the public of detours and construction hazards.
- C. The Contractor shall also be responsible for compliance with additional public safety requirements which may arise during construction.
- D. The Contractor shall furnish and install, and upon completion of the work, promptly remove all temporary signs and warning devices.
- E. All usage of the right-of-way shall be for a lawful purpose and shall not breach the peace or adversely interfere with public use of the right-of-way. The location, time and date of the use must be in accordance with requirements. All temporary signs for directional control and warning must be approved, properly erected and removed immediately after termination of the use. The Contractor shall be liable for any expense, damages or cost required to return right-of-way to its condition prior to use by the Contractor or to an improved condition if specifically required by the conditions of the permit. Police escorts, control and inspections may be required. All materials used in use-related structures shall be of fire-retardant materials and subject to Fire Department requirements. Other conditions may be imposed at the discretion of the right-of-way inspector.

- F. Construction in arterial right-of-way is only authorized between 9:00 a.m. and 3:00 p.m., Monday through Friday, without prior approval from the City.
- G. Construction in residential street right-of-way is only authorized between 7:00 a.m. and 7:00 p.m., Monday through Friday, without prior approval from the City.
- H. Unless otherwise authorized by the City, Contractor shall maintain at least one lane open at all times.
- I. The Contractor shall coordinate with the King County Signal Supervisor or Technician when necessary to override traffic signals. Point of contact is either Rick Thibodeau (206) 205-5587, Mark Parrett (206) 296-8153, or Doug Neigel (206) 296-8156. Countermanded traffic signals shall require the use of a City of Shoreline Police Officer for traffic control.

1.5 TRAFFIC CONTROL PLAN

- A. Temporary traffic control to ensure the traffic safety during construction activities must be provided. A City of Shoreline approved plan is required prior to starting construction activities.
- B. The traffic control plan shall minimize disruption to pedestrians. In the event of pedestrian disruption, the plan shall contain adequate pedestrian connections and clear signage.
- C. Not less than ten days before beginning construction, the Contractor shall prepare and submit a general construction traffic control plan for the entire project, showing how detour routes will be signed and controlled.
- D. The traffic control plan shall include and make provision for at least the following items:
 - 1. Maintain at least one lane of traffic during construction in all streets and roads wherever possible.
 - 2. Employ flag persons to direct traffic as required assuring safe vehicular traffic.
 - 3. Provide for the protection of pedestrians at all times.
 - 4. Where road closure is approved by the City of Shoreline, provide, install, and maintain all signs, barricades, posts, guards, and notices whenever a street must be completely closed.
 - 5. Provide, install, and maintain all signs, barricades, posts, guards, and notices whenever a street must be completely closed.
 - 6. Provide for passage of local vehicles to businesses and homes.
 - 7. Provide for passage and access of emergency vehicles, police, fire, and disaster units at all times. Assume liability for any damages resulting from failure to provide said access.
 - 8. Revise and update specific traffic control plan to reflect changes in the project schedule as required by the Owner.
 - 9. Compliance with locally required bypass and construction sequence plan.

1.6 STORAGE OF MATERIALS AND EQUIPMENT

- A. Materials or equipment shall not be stored where it will interfere with the free and safe passage of public traffic.
- B. During work hours, only materials and equipment necessary for construction are allowed in the roadway. Materials or equipment shall not be stored where it will be hazardous.
- C. During nonworking hours, the project site is to be left in a manner that is safe and protected from the public using the right-of-way. The Contractor shall remove all equipment and other obstructions from that portion of the roadway to be opened for use by public traffic at the end of each day's work and at other times when construction operations are suspended for any reason. Equipment and materials are not allowed in the right-of-way unless they are placed in a safe location or protected by permanent guardrails, lighted barricades or temporary concrete barriers

(permitted only if approved by the right-of-way inspector).

- D. Materials or other obstructions shall not be placed within 20 feet of fire hydrants, which shall at all times be readily accessible to the fire department, nor within ten feet of United States mailboxes.
- E. The location for parking and staging of materials and equipment shall be as agreed upon with the City of Shoreline or as arranged with private property owners. Use and restoration of private property used for parking, staging or storage of materials and equipment shall be the responsibility solely of the Contractor.

1.7 MAINTENANCE OF POSTAL SERVICE

- A. The Contractor shall be responsible for determining and complying with the United States Postal Department's requirements for maintaining postal service within the project area and along related detour routes.
- B. Where required by street closures or excessive interferences, the Contractor shall move mailboxes to temporary locations designated by the postal service and, when such closures are terminated, shall return the mailboxes to locations and conditions satisfactory to the owners and the postal service.
- C. Other mailboxes removed or damaged by the Contractor shall be placed to the satisfaction of the owners and the postal service within 24 hours of their removal or damage.

1.8 TEMPORARY STREET CLOSURES

- A. Signs shall be posted in a conspicuous place at each end of the roadway to be closed and at all intersections associated and/or adjacent to the closed segment of the street.
- B. The signs shall be posted no later than three (3) calendar days prior to the proposed closure.
- C. Any residential street closures will require a detour plan, signage and a public notice published in the newspaper-of-record three (3) calendar days prior to the proposed closure.
- D. For all nonemergency arterial street closures, the publication of the closure is required in addition to posting signs a minimum of three (3) calendar days in advance, regardless of the length of closure.
- E. The Contractor shall also notify authorities in charge of any municipal, private or school transportation system at least three (3) days in advance of road closures that will force a change in the regular routing of the transportation system,. The Contractor shall also provide and maintain suitable detour routes for the system.
 - 1. The Shoreline Police Department
 - 2. The Shoreline Fire District
 - 3. The Shoreline School District
- F. The City of Shoreline must approve in advance all temporary street closures, signage and notices.
- G. These standards shall be considered minimum; other notifications may be required as appropriate.

* * * END OF SECTION * * *

SECTION 01600

MATERIAL AND EQUIPMENT

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Royalties and Patents: Article 9 General Conditions
- B. Shop Drawings, Project Data, Samples: Section 01340

1.2 PRODUCTS LIST

- A. As soon as possible but not more than thirty (30) days after date of Notice to Proceed, submit to Engineer five (5) copies of complete list of all products which are proposed for installation as substitutions or product options.
- B. Tabulate list by each specification section.

1.3 CONTRACTOR'S OPTIONS

- A. Unless otherwise specifically provided, all workmanship, equipment, materials and articles incorporated in the work covered by the Contract are to be new and of the best available grade of their respective kinds.
- B. For products specified only by reference standards, select any product meeting standards, by any manufacturer.
- C. For products specified by naming one or more products, but indicating the option of selecting equivalent products by stating "or equivalent" after specified product, Contractor must submit request, as required for substitution, for any product not specifically named.
- D. For products specified by naming only one product and manufacturer, there is no option, and no substitution will be allowed.

1.4 SUBSTITUTIONS

- A. Within thirty (30) days after Notice to Proceed, Engineer will consider formal requests from Contractor for substitution of products in place of those specified.
- B. Submit request for substitution in accordance with requirements for submittal of shop drawings (Section 01340) and the following additional requirements.
 - 1. For construction methods:
 - a. Detailed description of proposed method
 - b. Drawings illustrating methods
 - 2. Itemized comparison of proposed substitution with product or method specification.
 - 3. Data relating to changes in construction schedule.
 - 4. Accurate cost data on proposed substitution in comparison with product or method specified.
- C. In making request for substitution, Contractor represents:
 - 1. He has personally investigated proposed product or method, and determined that it is equivalent or superior in all respects to that specified.
 - 2. He will provide the same guarantee for substitution as for product or method specified.
 - 3. He will coordinate installation of accepted substitution into work, making such changes as may be required for work to be complete in all respects.
 - 4. He waives all claims for additional costs related to substitution which consequently becomes apparent.
 - 5. Cost data is complete and includes all related costs under his Contract, but excludes costs under separate contracts and Engineer's redesign costs. Contractor agrees to pay for all costs under separate contracts and Engineer's redesign costs.

- D. Substitutions will not be considered if:
 - 1. They are indicated or implied on shop drawings or project data submittals without formal request submitted in accord with Section 01340.
 - 2. Acceptance will require substantial revision of Contract Documents.
- E. The above shall not be construed to mean that any substitution for materials and equipment will be allowed. The Engineer reserves the right to reject and disapprove any request he deems irregular or not in the interest of the Owner.

1.5 MATERIAL CERTIFICATION

- A. Upon request of the Engineer, the Contractor's material suppliers may be required to furnish a certification from a recognized testing laboratory, certifying that the material supplied is in full conformance with the Contract Documents.

1.6 ADDITIONAL ENGINEERING COSTS

- A. Additional engineering costs accruing as a result of checking and/or redesign of substitutions will be charged to the Contractor and billed by the Owner at the Engineer's current established rates.

1.7 INSTALLATION

- A. All materials, appliances, fixtures, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with such instructions as are commonly furnished by the manufacturers, unless herein specified to the contrary.
- B. The Contractor shall use experienced millwrights, acceptable to the Engineer, in the installation and aligning of the equipment.
- C. At least one copy of the installation instructions shall be furnished to the Engineer no later than four days after the equipment arrives on site.
- D. Manufacturers' instructions for handling, protecting, installation, lubrication and alignments of the equipment, shall be followed to the letter and these installation instructions shall be considered a part of this Contract, with attendant penalties for insufficient performance.
- E. No piping or valves shall be supported by means of its connection to any mechanical equipment. Pipe connections to equipment must be disconnected upon request to permit inspection and determination that the piping is not transmitting stresses to the equipment.
- F. All motor flexible couplings shall be disconnected and checked with an indicator for misalignment after all other installation work has been completed unless the equipment installation instructions specifically prohibit this.
- G. The Contractor must allow a representative of the Owner to observe the indicator readings and approve or disapprove prior to re-coupling.

1.8 PUMPS AND PIPING

- A. All pump and piping installations shall fully meet the standards of the Hydraulic Institute.

* * * END OF SECTION * * *

SECTION 01650

TESTING, STARTUP AND OPERATION

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Testing Laboratory Services: Section 01410
- B. Inspection Services: Section 01420
- C. Temporary Water: Section 01515
- D. Contract Closeout: Section 01700
- E. Operation and Maintenance Data: Section 01730

1.2 RESPONSIBILITY

- A. Testing, startup and operation shall not be cause for claims for delay by the Contractor and all expenses accruing therefrom, shall be deemed to be incidental to the Contract.
- B. The Contractor shall provide all materials, supplies and labor necessary to efficiently complete the testing, startup and operation.
- C. All power and utility bills shall be paid by the Contractor up to and including the day of final acceptance of the Contract by the Owner. If not paid, these charges shall be treated as claims against the Contractor.
- D. If the Owner chooses to commence operations prior to final acceptance, the Owner will assume payment of all power and utility charges effective the day that operation is assumed by the Owner and notice is given in writing.

1.3 SCHEDULE

- A. Placing all phases of the project in service shall consist of three parts: testing, starting and operations.
- B. Not less than thirty (30) days before anticipated time for beginning the testing, the Contractor will submit to the Engineer for approval, a complete plan for:
 - 1. Schedules for tests.
 - 2. Detail schedules of procedures for startup.
 - 3. Complete schedule of events to be accomplished during startup.
 - 4. Schedule operator training as specified.
 - 5. An outline of work remaining under the Contract that will be carried out concurrently with the operation phases.
- C. Notify the Engineer of the approximate date that water or sewage will be required for operation.

1.4 TESTING

- A. Testing shall consist of individual tests and checks made on equipment intended to provide proof of performance of units and proper operation of unit controls together with such necessary tests whether or not described elsewhere in these Specifications to assure proper alignment, size, condition, capability, strength, proper adjustment, lubrication, pressure, hydraulic tests, leakage tests and all other checks deemed necessary by the Engineer to determine that all materials and equipment are of specified quality, properly situated, anchored and in all respects ready for use.
- B. All gravity sewer pipe and pressure piping shall be tested as required by these specifications and applicable codes.
- C. Tests on individual items of equipment, pipelines, vessels, structures, tanks, controls and other items shall be as described in various sections describing such items.
- D. Testing will be done by the Contractor in the presence of an Inspector designated by the Engineer. Records of all official tests will be made by the Inspector.

- E. During tests, the Contractor shall correct any defective work discovered or that is not in first class operating condition.

1.5 STARTUP

- A. Startup shall consist of testing by a simulated operation (using clear water to be furnished by the Contractor), all operational equipment and controls. The purpose of these tests shall be to check that all equipment will function under operating conditions, that all interlocking controls and sequences are properly set and that the facility will function as an operating unit.
- B. Checks for leakage of tanks, ponds, piping, valves, gates and all other hydraulic systems and structures will be made.
- C. Factory representatives of all major units will be present for the startup phase. The test shall continue until it is demonstrated that all dysfunction of controls and machinery are corrected.
- D. The startup shall not begin until all tests required by these Specifications have been completed and approved by the Engineer.
- E. The Contractor may, if approved by the Engineer, conduct the hydraulic testing of pumps, aerators and other equipment requiring large volumes of liquid simultaneously with the startup test. If required by the Owner, the Contractor shall dispose of the water used by pumping to waste.

1.6 OPERATION

- A. Operation of the facility shall be immediately started after completion of testing and startup and after satisfactory repairs and adjustments have been made and providing supply and disposal facilities furnished by others are available. If these facilities are not available, the plant will be closed down and no further testing or operation by the Contractor will be required. The Contractor, however, will be responsible that all details required by the Contract shall remain in good order until final acceptance of the whole Contract.
- B. The facility will be operated by personnel placed on the project by the Owner who will perform all duties and operate all equipment.
- C. Taking possession and use of the facility shall not be deemed an acceptance of any work not completed in accordance with the Contract Documents.
- D. If such prior use increases or causes refinishing of completed work, the Contractor shall be entitled to such extra compensation or extension of time or both, as the Engineer may determine.

* * * END OF SECTION * * *

SECTION 01700 CONTRACT CLOSEOUT

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Protection of Work and Property: Section 01545
- B. Cleaning: Section 01710
- C. Project Record Documents: Section 01720

1.2 SUBSTANTIAL COMPLETION

- A. Contractor:
 - 1. After testing and startup, submit written certification to Engineer that Project or designated portion of Project is substantially complete.
 - 2. Submit list of items to be completed or corrected.
- B. Engineer will make an inspection after receipt of Contractor's certification, together with Owner's representative.
- C. If it appears to the Engineer that work is substantially complete:
 - 1. The Engineer may request of and the Contractor shall prepare and submit to Engineer, a list of items to be completed or corrected as determined by the inspection.
 - 2. If the Engineer then considers the work to be substantially complete, the Engineer may, with the Owner's approval, issue a Certificate of Substantial Completion, with appropriate conditions, accompanied by a list of the items to be completed and corrected, as verified and amended by Engineer. Omission of any item from the list shall not relieve the Contractor from responsibility to complete all the work in accordance with the Contract.
 - 3. Owner occupancy of Project or designated portion of Project:
 - a. Contractor shall perform final cleaning in accordance with Section 01710.
 - b. Owner may use all or part of the work within the time designated in the Certificate of Substantial Completion, upon notice to the insurance company or companies as provided in Article 21 of the General Conditions.
 - 4. Contractor shall complete all the work within the time designated in the Certificate, or if not so designated within a reasonable time.
- D. Should the Engineer consider that work is not substantially complete:
 - 1. He shall notify the Contractor, in writing stating reasons.
 - 2. Contractor shall complete work and send second written notice to Engineer certifying that Project or designated portion of Project is substantially complete.
- E. Warranties: Under Article 29.1 of the General Conditions guarantee and warranty periods begin with the date of final acceptance. However, in connection with any specific equipment certified by the Engineer as completed and its use or operation thereof for its intended purpose is assumed by the Owner, the warranty period for such equipment shall begin with the beginning date of such use or operation.

1.3 FINAL INSPECTION

- A. The Contractor shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Work has been completed in accordance with Contract Documents.
 - 3. Equipment and systems have been tested in presence of Owner's representative and are operational.
 - 4. Project is completed, and ready for final inspection.
- B. Engineer will make final inspection within a reasonable time after receipt of certification.

- C. Should Engineer consider that work is complete in accordance with requirements of Contract Documents, he shall request Contractor to make project closeout submittals.
 - D. Should Engineer consider that work is not complete:
 - 1. He shall notify Contractor, in writing, stating reasons.
 - 2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Engineer certifying that work is complete.
 - 3. Engineer will re-inspect work.
- 1.4 RE-INSPECTION COSTS
- A. In addition to any overtime inspection due under Article 15 of the General Conditions, should Engineer be required to perform second inspections because of failure of work to comply with original certifications of Contractor, Owner will compensate Engineer for additional services as stated in said article and charge the Contractor for such fees at the Engineer's currently established billing rate.
- 1.5 CLOSEOUT SUBMITTALS
- A. Project Record Documents: See requirements of Section 01720
 - B. Guarantees, bonds and certifications required by these specifications: See Articles 20, 22 and 29 of General Conditions and specific equipment or material specifications.
 - C. At the close of the Contract the Contractor shall:
 - 1. Pay all utility bills if applicable
 - 2. Remove all electrical, sanitary, gas, telephone, water, offices and any other temporary service equipment that may remain.
 - 3. Arrange for transfer of electrical, and water accounts to the Owner's name.
 - D. Deliver evidence of compliance with requirements of governing authorities:
 - 1. Certificates of Inspection:
 - a. Mechanical:
 - b. As required by codes.
 - c. Electrical:
 - i. State or city as required.
 - ii. Megger by Electrical Subcontractor.
- 1.6 FINAL ADJUSTMENT OF ACCOUNTS
- A. Submit final statement of accounting to Engineer.
 - B. Statement shall reflect all uncompleted adjustments:
 - 1. Additions and deductions resulting from:
 - a. Previous Change Orders
 - b. Cash Allowances
 - c. Unit Prices
 - d. Other Adjustments
 - e. Deductions for Uncorrected Work
 - f. Penalties and Bonuses
 - g. Deductions for Liquidated Damages
 - 2. Unadjusted sum remaining due.
- 1.7 FINAL APPLICATION FOR PAYMENT
- A. Contractor shall submit final application in accordance with requirements of General Conditions.
- 1.8 FINAL CERTIFICATE FOR PAYMENT
- A. Engineer will issue Final Certificate in accordance with provisions of General Conditions.

- B. Should final completion be materially delayed through no fault of Contractor, Engineer may issue a Final Certificate for Payment, in accordance with provisions of General Conditions and existing laws.

1.9 POST-CONSTRUCTION INSPECTION

- A. Prior to expiration one year from Date of Substantial Completion or Final Acceptance, Engineer may make visual inspection of Project in company with Owner and Contractor to determine whether correction of work is required, in accordance with provisions of General Conditions.
- B. For guarantees beyond one year, Engineer will make inspections at request of Owner, after notification to Contractor.
- C. Owner will promptly notify Contractor, in writing, of any observed deficiencies.

* * * END OF SECTION * * *

SECTION 01710 CLEANING

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Cutting and Patching: Section 01045
- B. Temporary Controls: Section 01560
- C. Contract Closeout: Section 01700

1.2 GENERAL REQUIREMENTS

- A. Maintain premises and public properties free from accumulations of waste, debris, and rubbish caused by operations.
- B. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.

1.3 SAFETY REQUIREMENTS

- A. Standards: Maintain project in accord with the applicable federal, state and local safety standards.
- B. Hazards Control:
 - 1. Store volatile wastes in covered metal containers, and remove from premises daily.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws:
 - 1. Do not burn or bury rubbish and waste materials on project site unless approved by local fire and air pollution authorities.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways.

2. PRODUCTS

2.1 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

3. EXECUTION

3.1 DURING CONSTRUCTION

- A. Execute cleaning to insure that grounds and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Wet down dry materials and rubbish to prevent blowing dust
- C. Remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.
- D. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- E. The Contractor shall clean the right-of-way, material sites and all ground the Contractor occupied to do the work periodically throughout the duration of the project. All rubbish, surplus materials, discarded materials and debris shall be removed from the site and disposed of properly. At the minimum, the Contractor shall conduct such periodic cleaning for each 1,000 feet of pipeline installed, prior to proceeding with installation of additional pipeline. Such cleaning shall also occur

immediately prior to weekends, holidays, extended work stoppages or at the direction of the Owner, or other regulatory agencies having jurisdiction.

3.2 FINAL CLEANING OF STRUCTURES

- A. Employ experienced workmen, or professional cleaners, for final cleaning.
- B. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
- C. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine finish.
- D. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.
- E. Broom clean paved surfaces; rake clean other surfaces of grounds.
- F. Clean windows.
- G. Replace air conditioning filters if units were operated during construction.
- H. Clean ducts, blowers and coils, if air conditioning units were operated without filters during construction.
- I. Maintain cleaning until project is occupied by Owner.

3.3 FINAL CLEANUP OF PIPELINES

- A. Final cleanup work shall be completed as closely behind the construction work as it is physically possible to do.
- B. Unless otherwise specifically provided in writing only those portions of the completed work will be included in the partial pay estimates where, in the Engineer's opinion, the cleanup work has been satisfactorily completed.
- C. Refer to specific sections for detail requirements for cleanup of pipelines.

3.4 GENERAL CLEANUP

- A. Before final acceptance, the Contractor shall remove and obliterate, insofar as feasible, all objects or disturbances of the ground which mar the landscape and were caused by his operations, whether or not part of the improvement.
- B. Rubbish, excess materials, temporary structures, and discarded equipment shall be removed and disposed of.
- C. Temporary haul roads shall be scarified and bladed to blend with surroundings.
- D. Remove snags, down trees, brush, and stumps.
- E. Fill holes and grade to smooth land contours. Shape ends of cuts and fills to fit adjacent terrain.
- F. Hand rake disturbed areas to remove loose objects including rock and clods in excess of two inches in any dimension.
- G. Sweep pavement, curb and gutter, sidewalks and driveways.

* * * END OF SECTION * * *

SECTION 01720 PROJECT RECORD DOCUMENTS

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Documents: Article 6 General Conditions
- B. Shop Drawings, Project Data and Samples: Section 01340

1.2 MAINTENANCE OF DOCUMENTS

- A. Maintain at job site, one copy of:
 - 1. Contract Drawings
 - 2. Project Manual
 - 3. Addenda
 - 4. Reviewed Shop Drawings
 - 5. Change Orders
 - 6. Other Modifications to Contract
 - 7. Field Test Records
 - 8. Maintenance Data Delivered with Equipment
- B. Store documents in field office, apart from documents used for construction.
- C. Provide files and racks for storage of documents.
- D. Maintain documents in clean, dry, legible condition.
- E. Do not use record documents for construction purposes.
- F. Make documents available at all times for inspection by Engineer and Owner.

1.3 RECORDING

- A. Do not permanently conceal any work until required information has been recorded.
- B. Keep documents current.
- C. Contract Drawings: Legibly mark to record actual construction:
 - 1. Depths of various elements of foundation in relation to variances from plan.
 - 2. Horizontal and vertical location of underground utilities and appurtenances and references to permanent surface improvements.
 - 3. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - 4. Field changes of dimension and detail.
 - 5. Changes made by Change Order or Field Order.
 - 6. Details not on original Contract Drawings.
 - 7. Side sewer locations including stubs and tees.
- D. Specifications and Addenda: Legibly mark up each Section to record:
 - 1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
 - 2. Changes made by Change Order or Field Order.
 - 3. Other matters not originally specified.
- E. Shop Drawings: Maintain as record documents; legibly annotate drawings to record changes made after review.

1.4 SUBMITTAL

- A. At completion of project, deliver record documents to Engineer.
- B. Underground utilities, duct banks, process piping, and extent of all underground vaults and foundations shall be drawn to scale in AutoCAD 2012 electronic format or older version and shall be transmitted electronically and as sequential, 22"x34" full size paper drawings. Match lines shall be included and noted. Incorporate materials and quantity lists on drawings.
- C. Accompany submittal with transmittal letter, in duplicate, signed by the Contractor, or his authorized representative.

* * * END OF SECTION * * *

SECTION 01730

OPERATION AND MAINTENANCE DATA

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Material and Equipment: Section 01600
- B. Testing, Startup and Operation: Section 01650
- C. Contract Closeout: Section 01700
- D. Spare Parts and Maintenance Materials: Section 01750
- E. Material and Equipment Specified: All Divisions

1.2 DATA

- A. The Contractor shall furnish the Engineer with five (5) bound copies of maintenance data on all machinery and equipment furnished under this Contract. The manuals shall include the following:
 - 1. Equipment operating and maintenance instructions: Equipment manufacturer's recommended step-by-step procedures for starting, operating, and stopping the equipment under specified modes of operation, including initial startup, normal operation, and emergency operation.
 - 2. Factory parts list: Generic title and identification number of each component part of the equipment, complete with exploded views of each assembly and weights of individual components weighing over 100 pounds. Provide interchangeability listings of all component sources and original manufacturer's part number.
 - 3. Detailed assembly and disassembly instructions.
 - 4. Equipment specifications and guaranteed performance data.
 - 5. Name, address and telephone of vendor and spare parts sources.
 - 6. Manufacturers' guarantees and warranties.
 - 7. Preventive maintenance procedures: Equipment manufacturer's recommended steps and schedules for maintaining the equipment. Maintenance procedures shall include preventive and corrective maintenance.
 - 8. Troubleshooting information including a tabular list of typical malfunctions and probable remedies.
 - 9. Overhaul instructions: Manufacturer's directions for the disassembly, repair, and re-assembly of the equipment and any safety precautions that must be observed while performing the work.
 - 10. Spare parts list: Manufacturer's recommendations of number of parts that should be stored by the District; any special storage precautions that may be required, current list price of the parts; name, address, and phone number of the nearest parts supplier. Spare parts list shall be limited to those spare parts which the manufacturer recommends be maintained at the site. Spare parts list shall indicate (1) those parts provided as part of this contract, and (2) those parts with an anticipated delivery time of greater than two months.
 - 11. Exploded views of mechanical equipment shall be provided, unless specified in the equipment description as not required; when exploded views are specified as not necessary, cut or section views shall be provided with detailed callouts.
 - 12. Additional information as required in the Technical Specifications.
- B. Control diagrams: Record diagrams showing internal and connection wiring.

1.3 QUALITY

- A. Data shall be bound in first quality, heavy-duty, view type, permanent type 3-ring binders, 8 ½ inches by 11 inches, suitable for bookshelf storage. Binder ring size shall not exceed 3 inches.

- B. Manuals shall be assembled with a table of contents and indexed with tab sheets so that information on any piece of equipment can be readily found.
- C. The manufacturer's manual shall be appropriately labeled with the equipment name and equipment number as it appears in the specifications on the cover and the spine of the binder.
- D. If manufacturer's standard instruction and maintenance manuals are used to describe operating and maintenance procedures, such manuals shall be modified to reflect only the model or series of equipment used on this project. Extraneous material shall be crossed out neatly or otherwise annotated or eliminated.

1.4 FORM

- A. The operating and maintenance instructions shall be the first item listed for each piece of equipment. It shall include, in addition to necessary details, a "summary of maintenance" substantially in the following format:
 - 1. Name of item.
 - 2. Name of manufacturer.
 - a. Address.
 - 3. Name plate information, including model numbers and serial numbers.
 - 4. Nearest local representative and nearest supplier of the manufacturer's equipment, parts, and service.
 - a. Addresses.
 - b. Telephone numbers.
 - 5. Maintenance checklist form shall include:
 - a. Maintenance requirements.
 - b. Date or frequency .
 - c. Lubrication information, including the type of required lubricant, if applicable.
 - 6. Provide a list of acceptable lubricant from at least (3) manufacturers whose products are locally available. Spare parts list (of items to be kept on hand).
- B. The second item of each listing shall be a detailed narrative description of both the equipment and control circuits and a description of the recommended method for trouble shooting.
- C. The third item of each listing shall be the lubrication chart required in Section 01750 followed by drawings, charts and details.

* * * END OF SECTION * * *

SECTION 01750

SPARE PARTS AND MAINTENANCE MATERIALS

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Operation and Maintenance Data: Section 01730
- B. Specific Requirements for Individual Items: All Divisions

1.2 SPARE PARTS

- A. All equipment shall be furnished with spare parts as recommended by the manufacturer. All bearings, bushings and shaft sleeves shall be "export" packaged.
- B. Additional spare parts shall be furnished when specifically listed under any products.

1.3 LUBRICANTS

- A. The Contractor shall have a lubricant manufacturer's representative inspect each piece of new equipment and make a maintenance chart on which shall be shown, in a list, each item of equipment requiring lubricant, the type and quantity of lubricant required, the frequency of lubrication required and a space for the last date that each piece of equipment was lubricated.
- B. The Contractor shall provide a one year's supply of every kind of packing grease, or oil required for new equipment.
- C. The Contractor shall furnish all oil cans, grease guns and all other necessary items for proper lubrication.
- D. Lubrication charts shall be included in the maintenance manual.

* * * END OF SECTION * * *

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SECTION 02050 DEMOLITION

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Site Clearing: Section 02110
- B. Excavating, Backfilling and Compacting for Utilities: Section 02222
- C. Pavement Repair and Resurfacing: Section 02575

1.2 PROTECTION

- A. Streets, roads, adjacent property and other work to remain shall be protected throughout the work.
- B. Pavement may be cut only where authorized and only to the extent specified.
- C. Anything not identified to be demolished or removed damaged by Contractor's operations shall be replaced as new by Contractor at Contractor's expense.

1.3 CUTTING PAVEMENT, CURBS AND WALKS

- A. Unless specified otherwise by the authority having control over the pavement, curbs and walks, cutting and replacement shall be as specified in Section 02575.

1.4 PRIVATE DRIVEWAYS, CULVERTS AND MISCELLANEOUS

- A. Pipe laying operations in certain areas may necessitate temporary removal of mail boxes, private driveways, drains, service lines, conduits, etc. to facilitate construction. In the event that the Contractor finds it necessary to remove the above mentioned items, it is to be understood that it will be his responsibility to restore these items in a manner equal to their original condition. The Contractor shall maintain adequate temporary provisions for domestic deliveries and utilities service and access to firefighting equipment.
- B. The preceding requirement will be the same for any temporary removal of road culverts, whether under state, county or private jurisdiction.
- C. The cost of the above described work shall be included in the price bid for pipe and no additional compensation shall be made to the Contractor.
- D. The Contractor shall make every effort to prevent blocking private driveways for more than a reasonable time and shall make such driveways immediately accessible on order of the Owner.

1.5 REMOVAL OF STRUCTURES

- A. The Contractor shall raze, remove, and dispose of all buildings and foundations, structures, fences, and other obstructions that are indicated in the drawing.
- B. Remove foundations to a depth of at least 5 feet below finished ground elevation or subgrade elevation, whichever is lower.
- C. Break up basement floors to promote drainage.
- D. Fill basements or other cavities left by the removal of structures to match the level of surrounding ground.
- E. When salvageable material is to remain the Owner's property, the Contractor shall remove it and deliver it to site designated by the Engineer or project documents. Any material not designated as the Owner's property will belong to the Contractor. The Contractor shall store or dispose of such material at suitable disposal site or at his storage yard.
- F. Work crews shall be provided with proper protective clothing and equipment.
- G. Waste and abandoned asbestos materials and materials, clothing, etc. used in asbestos handling and removal shall be disposed of in a manner consistent with the regulations and provisions cited above.

- H. All costs associated with the demolition and abandonment of asbestos material shall be considered incidental to the work; no additional compensation will be made to the Contractor.
- I. The Contractor (person or organization removing asbestos with certified asbestos workers) shall assume ALL risk and all liability for the removal and disposal of the asbestos and the Contractor shall comply with all federal, state and local laws, statutes and regulatory agency regulations and requirements including but not limited to the requirements relating to environmental pollutants and the requirements relating to the removal and disposal of asbestos. The Contractor shall insure that the asbestos removal is pursuant to all state and federal laws and regulations. The Contractor shall be responsible for any and all fines or penalties which may be levied due to the Contractor's violation of any of the aforementioned laws and regulations.

1.6 ASBESTOS REMOVAL

- A. The Contractor shall conduct all work related to existing asbestos materials in accordance with WISHA safety regulations and provisions of WAC 296-62-077, WAC 295-65 and the requirements of the regional air pollution control authority. Advance notice of work on asbestos materials may be required.
- B. Work crews shall be provided with proper protective clothing and equipment.
- C. Waste and abandoned asbestos materials and materials, clothing, etc. used in asbestos handling and removal shall be disposed of in a manner consistent with the regulations and provisions cited above.
- D. All costs associated with the demolition and abandonment of asbestos material shall be considered incidental to the work; no additional compensation will be made to the Contractor.
- E. The Contractor (person or organization removing asbestos with certified asbestos workers) shall assume ALL risk and all liability for the removal and disposal of the asbestos and the Contractor shall comply with all federal, state and local laws, statutes and regulatory agency regulations and requirements including but not limited to the requirements relating to environmental pollutants and the requirements relating to the removal and disposal of asbestos. The Contractor shall insure that the asbestos removal is pursuant to all state and federal laws and regulations. The Contractor shall be responsible for any and all fines or penalties which may be levied due to the Contractor's violation of any of the aforementioned laws and regulations.

* * * END OF SECTION * * *

SECTION 02110 SITE CLEARING

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Demolition: Section 02050
- B. Excavating, Backfilling and Compacting for Utilities: Section 02222

1.2 PROTECTION

- A. Streets, roads, adjacent property and other work to remain shall be protected throughout the work.

2. PRODUCTS

2.1 MATERIALS

- A. Materials shall be at the Contractor's option.

3. EXECUTION

3.1 SURVEY STAKING IN UN-CLEARED EASEMENTS

- A. Centerlines of utility lines shall be flagged prior to clearing and it shall be the Contractor's responsibility to set his own offsets for clearing limits.
- B. If the controls or stakes are damaged or destroyed, the cost of replacement shall be at the expense of the Contractor.

3.2 CLEARING

- A. Clearing work shall be performed within the confines of the area indicated on the Drawings, or in the Specifications.
- B. Debris resulting from said clearing shall be disposed of by the Contractor and the right-of-way cleaned up in a neat and workmanlike manner.
- C. No logs, stumps, rocks, etc., shall be left lying in the right-of-way or on adjacent property without specified written approval by the Owner.
- D. All trees shall be felled within the area to be cleared except those marked to be left standing, or required by easement stipulations or by contract to be left standing. Trees shall be close cut parallel to the ground, removed and disposed of at the expense of the Contractor.
- E. No trees or shrubbery in public right-of-way shall be cut except by approval of the Engineer.

3.3 GRUBBING

- A. All trees or stumps within five (5) feet of the pipeline shall be removed.
- B. Grubbing will be performed where designated on the drawings or as specified herein and shall include removal from the ground of all stumps, roots, buried logs and other vegetation not otherwise provided for and the removal and disposal of the refuse.
- C. In areas to be filled to a depth of three (3) feet or more above the natural ground all tree stumps and brush shall be cut off not more than three (3) inches from the ground and removed.
- D. Where unsuitable surface material is to be removed, complete grubbing will be required.

3.4 DAMAGED VEGETATION

- A. Neatly trim torn limbs and trunk and severed roots.
- B. Apply wound paint to above-ground wounds.
- C. Remove and replace in kind all vegetation damaged extensively.

3.5 DISPOSAL

- A. Contractor shall comply with all laws and rules that govern burning and shall secure necessary permits.

- B. When burning is permitted, it shall be done under the constant care of competent watchmen such that surrounding property or vegetative cover is not damaged.
- C. Contractor may sell any saleable material.
- D. Material not burned or sold shall be hauled to a disposal site secured by the Contractor at his expense.

* * * END OF SECTION * * *

SECTION 02140 DEWATERING

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Temporary Controls: Section 01560
- B. Excavating, Backfilling and Compaction for Utilities: Section 02222
- C. Sedimentation Control: Section 02275

1.2 QUALITY CONTROL

- A. It shall be the sole responsibility of the Contractor to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence.
- B. The Contractor shall employ an independent qualified Professional Engineer with experience in similar dewatering problems to review and approve the Contractor's proposed method of dewatering and to at least weekly, inspect the Contractor's operations and provide a report to the Engineer.
- C. All dewatering operations shall be adequate to assure the integrity of the finished project and shall be the responsibility of the Contractor.
- D. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points should be established and observed at frequent intervals to detect any settlement which may develop. Should significant settlement be observed, recharge wells could be placed between the structure and the trench and water pumped under pressure back into the soil.
- E. The responsibility for conducting the dewatering operation in a manner which will protect adjacent structures and facilities rests solely with the Contractor. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the Contractor.

2. PRODUCTS

2.1 EQUIPMENT

- A. Before operations begin, the Contractor shall have available on the site of work sufficient pumping equipment and/or other machinery to assure that the operation of the dewatering system can be maintained.

3. EXECUTION

3.1 METHODS

- A. Dewatering shall be done by such method as the Contractor may elect.
- B. Dewatering, sufficient to maintain the groundwater level at or below the surface of trench bottom or base of the foundation gravel shall be accomplished prior to excavation and placing of pipeline or concrete. The dewatering operation, however accomplished, shall be carried out so that it does not destroy or weaken the strength of the soil under or alongside the excavation.
- C. The normal water table shall be restored to its natural level in such a manner as to not disturb the pipe, its foundation and structures.
- D. If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sand packed and/or other means used to prevent pumping of fine sands or silts from the subsurface. A continual check by the Contractor shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation.
- E. Dewatering of the excavations shall be considered as incidental to the construction and all costs thereof shall be included in various unit contract prices in the Bid Form.
- F. Dispose of water so as not to cause injury to public or private property or to cause a nuisance or menace to the public and in accordance with the requirements of regulatory agencies.

- G. Construction of temporary facilities to dispose of water shall be incidental to the construction.
 - H. Permanent piping systems shall not be incorporated in the dewatering system.
- * * * END OF SECTION * * *

SECTION 02150 SHORING

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavating, Backfilling and Compacting for Utilities: Section 02222

1.2 QUALITY ASSURANCE

- A. Where the depth of excavation exceeds 20 (twenty) feet the Contractor's shoring systems shall be designed and inspected by a registered professional engineer with experience in the work, all in accordance with federal, state and local safety requirements (the most stringent requirement prevailing).
- B. Where the depth of excavation is less than 20 (twenty) feet, the Contractor shall provide, place and maintain responsibility for shoring, sheeting, bracing, sloping or otherwise support the sides of trenches and excavations, including embankments by a means of sufficient strength to protect employees. Such shoring and associated responsibilities shall be in accordance with federal, state and local safety requirements (the most stringent requirement prevailing).

1.3 SUBMITTAL

- A. For shoring systems to be used for depth of excavation greater than 20 (twenty) feet, submit material indicating compliance with federal, state and local safety requirements for shoring systems. Specifically, the material shall indicate that such systems have been designed by a registered professional engineer with experience in the work.

1.4 COMPETENT PERSON

- A. The Contractor shall be exclusively responsible for providing the services of the Competent Person as referenced in Section 296-155-650 Washington Administrative Code (WAC), relating to excavation, trenching and shoring.
- B. The Contractor shall be exclusively responsible for providing the services of a registered professional engineer for the design of the trench protective system as required in WAC Section 296-155-657.
- C. Representatives of the Owner and Engineer shall not be required to perform the roles of Competent Person or registered professional engineer as defined in WAC 296-155.

2. PRODUCTS

2.1 SHORING SYSTEMS

- A. Materials used shall be at the Contractor's option.

3. EXECUTION

3.1 SAFETY REQUIREMENTS

- A. Shoring shall be placed in accordance with federal, state and local safety requirements (the most stringent requirement prevailing)

3.2 SHORING SYSTEMS

- A. Unless otherwise provided, the Contractor shall provide all shoring systems needed to protect the work, adjacent property and improvements, utilities, pavement, etc., and to provide safe working conditions in the trench.
- B. Removal of any or all shoring systems from the trench shall be accomplished in such a manner as to fulfill all of the above requirements and shall also be accomplished in such a manner as to prevent any damage to the work.
- C. Damages resulting from improper shoring or from failure to shore shall be the sole responsibility of the Contractor.

- D. Whether shoring systems shall be left in place or removed shall be at the option of the Contractor, provided that removal of any and all shoring used in trench or structure excavation shall be accomplished in the manner as to prevent the settlement of the pipes or other work and to prevent increased backfill loading which might overload the pipe or walls of the structure.
- E. Shoring shall be removed to a minimum of 5 feet below the final grade.
- F. Should the Owner order that any shoring be left in place, the Contractor shall not remove the same but will receive payment for the materials left in place at the market value thereof.

3.3 SPECIAL REQUIREMENT FOR FLEXIBLE PIPE

- A. Shoring to be removed, or moveable trench shields or boxes, shall be located at least 2 pipe diameters away from the pipe if the bottom of the shoring, shield or box extends below the top of flexible pipe, unless a satisfactory means of reconsolidating the bedding or side support material disturbed by shoring removal can be demonstrated.
- B. Damages resulting from improper shoring or failure to shore shall be the sole responsibility of the Contractor.

* * * END OF SECTION * * *

SECTION 02202 ROCK EXCAVATION

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Demolition: Section 02050
- B. Excavating, Backfilling, and Compacting for Utilities: Section 02222
- C. Underground Utilities/Facilities - Underground and Overhead: Section 02760

1.2 DEFINITIONS

- A. Solid rock, firmly cemented unstratified masses or conglomerate deposits possessing the characteristics of solid rock not ordinarily removed without systematic drilling and blasting, and any boulder, masonry, or concrete except pavement and sidewalks and curbs, exceeding 2/3 cubic yard in volume.

1.3 QUALITY ASSURANCE

- A. Assign a qualified blasting specialist of mature experience that is specialized in the use of explosives to the blasting operation, and maintain on a full-time basis during the time that blasting is in progress.
- B. Blasting specialist shall have a valid state powder license, as required.
- C. Comply with federal, state and local safety codes concerning transportation, handling, storage and use of explosives.
- D. Comply with requirements of road agency when project is on public right-of-way.

1.4 SUBMITTAL

- A. Schedule outlining time and locations of all drilling and blasting operations.
- B. Pre-blast survey report shall be submitted prior to start of blasting.

1.5 PERMITS

- A. Contractor shall be responsible for obtaining any federal, state, or local permits required for the transportation, storage, or use of explosives.

1.6 PRE-BLAST SURVEY

- A. Contractor shall conduct a pre-blast survey of the interior and exterior of every structure identified as being within a zone of potential damage from adjacent blasting within a minimum of 100 feet each side of the blasting area.
- B. Survey to be conducted by a person experienced in said surveys.
- C. Prepare a photographic or video tape record outlining specific structural defects as well as general condition of each structure:
 - 1. Photographs shall be 3" x 5" minimum size, glossy finish, in color and unmounted.
 - 2. All photographs shall be taken by an acceptable commercial photographer hired by the Contractor.
 - 3. Each photograph shall be marked with date and identification.
- D. Provide a written record including at least the following items:
 - 1. Date and time of inspection
 - 2. Name of inspector
 - 3. Location
 - 4. Signature of person granting the approval for inspection
 - 5. Name of person refusing approval to inspect
 - 6. Description of specific structural defects as well as general condition of each structure
 - 7. Other criteria recommended by blasting specialists
- E. Provide the Engineer and Owner with one (1) copy each of the photographs and written report prior to start of any work within the area in question.

1.7 NOTIFICATION

- A. The Contractor shall notify the Engineer, Police Department and Fire Department 24 hours in advance of detonating any charges.
- B. Provide ample warning to all persons within the vicinity prior to blasting.
- C. Erect warning signs.
- D. Station personnel to warn people prior to blasting.

1.8 PAYMENT

- A. No separate payment will be made unless a separate bid item is included in the bid form.

2. PRODUCTS

2.1 MATERIALS

- A. Use explosive and initiators as recommended by the blasting specialist.
- B. Use any standard cartridge explosives prepared and packaged by explosive manufacturing firms.

3. EXECUTION

3.1 TECHNIQUES

- A. In excavating rock, the Contractor shall exercise care and use precautionary methods so as to not break down, loosen or otherwise damage the supporting rock below the subgrade line.
- B. The Contractor shall be responsible for the methods used and for any damage resulting from his operations.
- C. The slopes of all rock cuts shall be scaled and dressed to a safe, stable condition by removing all loose spalls and rocks not firmly keyed to the rock slope and by removing all overhanging rock which may be a hazard to workmen or public.
- D. The Contractor shall drill, blast and excavate short test sections to determine the blasting method, hole spacing and charge best suited to the material encountered, in order to obtain the desired rock fracture, and make necessary adjustments.

3.2 PROTECTION

- A. Contractor shall control flying rock by proper spacing of charges and by placing blast mats or mounding soil over the shots after loading.
- B. Contractor shall control noise due to blasting by proper stemming and cover of blast holes, control of blasting during heavy cloud cover, and shall control time of blasting to conform to specific requirements at each site.
- C. Air blast pressures exerted on structures shall be kept below limits which may damage the structure.
- D. All damage caused by Contractor's blasting operations shall be repaired at no additional cost to the Owner. Contractor shall be responsible for receiving and negotiating claims for damage.

3.3 WASTE MATERIAL

- A. All shot rock removed from the excavation must be hauled to a waste site secured by the Contractor unless the material can be used for backfill or embankment included in the project.
- B. Material used in the project must conform to the requirements of these specifications.

3.4 LIMITS OF ROCK EXCAVATION

- A. Excavate to minimum of 6 inches below bottom of pipe barrel and sufficient distance outside of pipe to install pipe and bedding.
- B. Maximum width of trench shall be 24 inches wider than the pipe barrel.
- C. Excavate to minimum of 6 inches below structure subgrade unless otherwise specified.
- D. Excavate to subgrade for roadways.

* * * END OF SECTION * * *

SECTION 02222
EXCAVATING, BACKFILLING AND COMPACTING FOR UTILITIES

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Demolition: Section 02050
- B. Site Clearing: Section 02110
- C. Shoring: Section 02150
- D. Sedimentation Control: Section 02275
- E. Sanitary Sewers: Section 02730
- F. Existing Utilities/Facilities Underground and Overhead: Section 02760

1.2 CLASSIFICATION

- A. All excavation is unclassified unless separate bid item is included in bid form.
- B. The terms earthwork or excavation include all materials excavated or removed regardless of material characteristics.
- C. The Contractor shall make his own estimate of the kind and extent of materials which will be encountered in the excavation.

1.3 QUALITY CONTROL ASSURANCE

- A. Soils and Backfill: Moisture density standard ASTM D1557 or AASHTO T-180 method unless otherwise specifically approved.
- B. In place Density Determination: Sandcone method ASTM D1556 or Nuclear method ASTM D6938.
- C. Classification of Soils: ASTM D2487.
- D. Quality control monitoring of subgrade backfill and embankment materials and construction by certified independent laboratory approved by Engineer and secured and paid for by the Contractor.

1.4 SUBMITTALS

- A. Import aggregate gradation and moisture density relationship curves.
- B. Native materials and embankment gradations and moisture density relationship curves.
- C. Certification of gradation and compliance with referenced standards and moisture density relationship curve standards.
- D. Density test results in approved format.
- E. At any time the Contractor shall change the source and/or stockpile from which materials are obtained, certificates of gradation and moisture density relationship curves for these new sources will also be required. The Contractor shall make allowances in his unit prices bid for these items to cover expenses incurred in having this certification made and no additional compensation will be allowed.
- F. During construction, the Owner may elect to have further gradation testing completed on the materials being furnished by the Contractor. This testing will be at the expense of the Owner, however, the Contractor shall provide material samples as may be necessary to complete this testing and these material samples will be furnished from material available on the job site or from the Contractor's source and/or supplier.
- G. Controlled Density Fill (CDF): Furnish a certificate with each truckload of CDF product delivered to the site, indicating the composition and quality of the mix. Include size and weight of each aggregate, amount of cement, amount of water and amount and kind of any additives.

2. PRODUCTS

2.1 CRUSHED ROCK

- A. Crushed rock shall be manufactured from ledge rock, talus, or gravel. The materials shall be uniform in quality and substantially free from wood, roots, bark, and other extraneous material and shall meet the following quality test requirements:

Los Angeles Wear, 500 Rev.	35% max
Degradation Factor – Top Course	25 min.
Degradation Factor – Base Course	15 min.

- B. Crushed rock shall meet the following requirements for grading and quality:

Sieve Size	<u>Percent Passing by Weight</u>	
	Base Course	Top Course and Keystone
1 1/4"	100	
1"	80-100	
3/4"		100
5/8"	50-80	
1/2"		80-100
No. 4	25-45	46-66
No. 40	3-18	8-24
No. 200	7.5 max.	10.0 max.
% Fracture	75 min.	75 min.
Sand Equivalent	40 min.	40 min.

- C. The fracture requirement shall be at least one fractured face and will apply to the combined aggregate retained on the No. 4 sieve in accordance with field operating procedures for AASHTO TP 61.
- D. The portion of crushed rock retained on a No. 4 sieve shall not contain more than 0.15 percent wood waste.

2.2 GRAVEL BEDDING

- A. Gravel bedding shall consist of crushed, processed, or naturally occurring material that is granular and well-graded. It shall be free from various types of wood waste or other extraneous or objectionable materials. It shall have such characteristics of size and shape that it will compact and shall meet the following quality and gradation, when tested in accordance with ASTM D422:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
3/4"	99-100
3/8"	70-100
No. 4	55-100
No. 40	10-55
No. 200	3.0 max.
Sand Equivalent	35 min.

2.3 BACKFILL GRAVEL

- A. All backfill gravel to be furnished under this Contract shall consist of naturally occurring screened or crushed gravel.
- B. Gravel shall be essentially free from wood waste or other extraneous or objectionable materials.
- C. Gravel shall have such characteristics of size and shape that it will compact readily, and the maximum particle size shall not exceed 2/3 of the depth of the layer being placed.

- D. Gravel shall meet the following requirements for grading and quality:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
2 ½ "	75-100
No. 4	22-100
No. 200	0-10
Dust Ratio	⅔ max.
Sand Equivalent	30 min.

- E. Gravel material retained on a No. 4 sieve shall contain not more than 0.2 percent by weight of wood waste.

2.4 NATIVE MATERIAL

- Material shall be selected soil free from roots or other organic material, debris, or frozen material.
- The maximum size of the material shall be 6 inches with no stone larger than 4 inches in the upper 6 inches of fill.
- Native material shall be free of excess moisture.
- The material shall be processed to the uniform measure and texture necessary to obtain the specified density.

2.5 TRENCH FOUNDATION GRAVEL

- At least two basic trench bottom conditions commonly cause problems: (1) where silty soils or fine sandy soils are encountered, they will usually flow in the presence of a stream of water, and (2) where clays, peats, or other soft materials are encountered, they may become saturated with water, but do not usually break down into fine particles and flow as do the silts or sands mentioned above.
- Trench foundation gravel shall be used when over excavation, as described in the Pipe Foundations paragraph under Execution in this section, is required.
- Condition (1) material: Where Condition (1) is encountered, the following trench foundation gravel has been found by experience usually to be adequate: clean bank run sand and gravel, free from dirt, roots, topsoil, and debris and containing not less than 35% retained on a No. 4 sieve and with all stones larger than 2 inches removed. Such gravel shall only be used in a dry trench bottom, free from quicksand or running sand.
- Condition (2) material: Where Condition (2) is encountered, Class A or Class B trench foundation gravel has been found by experience usually to be adequate. Other material may, however, be found more desirable by the Contractor:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>	
	<u>Class A</u>	<u>Class B</u>
2 ½ "	98-100	95-100
2"	92-100	75-100
1 ½ "	72-87	30-60
¾ "	27-47	0-5
⅜ "	3-14	—
No. 4	0-5	—

- Trench foundation gravel shall contain no pieces larger than 5 inches, measured along the line of greatest dimension.

2.6 FILTER ROCK

- A. Filter rock shall conform to the following gradation:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
1"	100
¾ "	95-100
⅜ "	10-55
No. 4	5 max.
No. 200	0-1.5

- B. Rock material retained on a No. 4 sieve shall contain not more than 0.2 percent by weight of wood waste.

2.7 RIGID INSULATION

- A. Insulation shall be closed-cell, extruded polystyrene foam.
- B. The insulation shall have a typical five year aged thermal conductivity, k factor of 0.2 Btu/hr/sq.ft./°F/in when tested at 75° F mean temperature in accordance with ASTM C518.
- C. Minimum compressive strength of 25 psi when tested in the vertical direction in accordance with ASTM D1621.
- D. Maximum water absorption of 0.3% by volume when tested in accordance with ASTM C272.

2.8 CONTROLLED DENSITY FILL (CDF)

- A. CDF shall be a mixture of Portland cement, fly ash, aggregates, water, and admixtures proportioned to provide a non-segregating, self-consolidating and free-flowing material which will result in a hardened, dense, non-settling and excavatable fill.
- B. CDF shall be used as fill above utilities wherever non-settling backfill is required or as a hydraulic barrier between coarse and fine grained soil.
- C. CDF shall be a mixture of Portland cement, fly ash, aggregates, water, and admixtures which have been batched and mixed in accordance with Section 6-02.3 of the WSDOT/APWA Specifications. Materials are as follows:

1. Portland Cement	AASHTO M 85 OR WSDOT/APWA 9-01
2. Fly Ash	Class F
3. Aggregates	WSDOT/APWA 9-03.1(2)B
4. Water	WSDOT/APWA 9-25
5. Admixtures	WSDOT/APWA 9-23.6

- D. CDF shall be used in the following proportions for one cubic yard. Batch weights may vary depending on specific weights of aggregates.
- E. Maximum gallons of mixing water per cubic yard: 50.
- F. Lbs. of cement per cubic yard: 50.
- G. Lbs. of fly ash per cubic yard: 250.
- H. Lbs. of dry aggregate per cubic yard, Class 1 or 2 sand as per WSDOT/APWA 9-03.1(2)B: 3200.
- I. CDF shall be batched to provide a flowing, non-segregating mix with a slump between 6" to 8".

3. EXECUTION

3.1 TRENCHING

- A. Material shall be excavated from trenches and piled adjacent to the trench and maintained so that the toe of the slope of the spoil material is at least 2 feet from the edge of the trench or hauled from the trench to an approved disposal or storage site.
- B. Material shall be piled in such a manner that will cause a minimum of inconvenience to public travel.
- C. Free access shall be provided to all fire hydrants, water valves and meters, and clearance shall be left to enable the free flow of storm water in all gutters, conduits, and natural watercourses.
- D. Ledge rock, boulders, or stones shall be removed to provide a minimum clearance of 6 inches under and around the pipe to be installed.
- E. Contractor shall keep excavations free of water in accordance with Section 02140.
- F. Contractor is responsible for shoring in accordance with Section 02150.

3.2 TRENCHING FOR SEWERS AND DRAINS

- A. Trenches must be of sufficient width to permit proper jointing of the pipe and backfilling of material along the sides of the pipe.
- B. Trench width at the surface of the ground shall be kept to the minimum amount necessary to install the pipe in a safe manner.
- C. Trenches wider than the maximum specified may result in a greater load of overburden than the pipe is designed for, and consequently, if the maximum trench width is exceeded by the Contractor, the Contractor shall at his own expense, provide pipe of higher strength classification, or provide a higher class of bedding where necessary to assure that the pipe will not be overloaded.
- D. The normal maximum permissible trench width, at the bottom of the trench and up to a point at the crown of the pipe, shall be 1.5 times the inside diameter plus 18 inches, or a total of 40 inches, whichever is greater.
- E. Excavation for manholes and other structures shall be sufficient to provide a minimum of 12 inches between their outside surfaces and the sides of the excavation.
- F. The length of trench excavated in advance of the pipe laying shall be kept to a minimum, and in no case shall it exceed 150 feet unless specifically authorized by the Engineer.
- G. Trenches shall be excavated below the barrel of the pipe a sufficient distance to provide for gravel bedding specified.

3.3 PIPE FOUNDATIONS

- A. Where the trench bottom is in a material which is unsuitable for foundation or which will make it difficult to obtain uniform bearing for the pipe, such material shall be removed and a stable foundation provided in accordance with Standard Detail entitled "Foundation Gravel and Backfill".
- B. Proper preparation of foundation and placement of foundation material, where required, shall precede the installation of all pipe.
- C. Proper preparation includes bringing the native trench bottom and/or the top of the foundation material to a uniform grade so that the entire length of pipe rests firmly on suitable, properly compacted material.
- D. Gravel to be used for foundation purposes shall be of a type and gradation to provide solid compact bedding in the trench. Because trench conditions vary, foundation gravel requirements will change.
- E. Neither approval nor disapproval of the foundation material proposed by the Contractor shall relieve him of his responsibility to provide adequate pipe foundation and to guarantee his work as elsewhere required by the Contract.
- F. Unsuitable material for foundation purposes below the depth required for the specified bedding shall be removed and replaced with suitable foundation gravel.
- G. Excavated materials shall be disposed of at an approved waste site and all costs involved in the excavating and wasting of this material shall be considered as incidental to the foundation item, except that excavation more than 2 feet below the pipe invert shall be classified as extra excavation and paid for at the Extra Excavation unit bid price.

3.4 PIPE BEDDING

- A. Placement of gravel bedding in the pipe zone shall be as specified in the section regarding the pipeline being constructed.

3.5 BACKFILLING

- A. Gravel bedding to 6 inches over the top of the pipe shall be completed before backfilling operations are started.
- B. The Contractor shall take all necessary precautions to protect the pipe from any damage, movement or shifting. In general, backfilling shall be performed by pushing the material from the end of the trench into, along and directly over the pipe so that

the material will be applied in the form of a rolling slope rather than by side filling which may damage the pipe. Backfilling from the sides of the trench will be permitted after sufficient material has first been carefully placed over the pipe to such a depth as to protect the pipe.

- C. Compaction equipment used above the pipe zone shall be of a type that does not injure the pipe.
- D. Provide for the proper maintenance of traffic flow and accessibility as may be necessary.
- E. Make adequate provisions for the safety of property and persons.
- F. Temporary shoring shall be removed unless specifically authorized in writing.
- G. Dewatering shall be continued until the trench is completely backfilled.
- H. Brush, stumps, logs, planking, disconnected drains, boulders, etc., shall be removed from the material to be used for backfilling the trench.
- I. Where native material excavated is unsuitable for trench backfill, backfill gravel or specified material shall be placed.
- J. The unsuitable material shall be removed to an approved disposal area. Backfill gravel or specified material shall be used for backfill only where native material is unsuitable and upon approval by the Engineer.
- K. Where it is required that a blanket of import material be placed on top of the native backfill, the backfill shall be placed to the elevations shown on the Plans, or to the elevation the Engineer may direct, and shall be leveled to provide for a uniform thickness of the import material. Compaction of the native material shall be as required by the Owner.
- L. Backfill Gravel: Wherever a trench is excavated in a paved roadway, sidewalk or other area where minor settlements would be detrimental and where the native material is not suitable for compaction as backfill, the trench shall be backfilled to such depth as the Engineer may direct with backfill gravel or specified material.
- M. Controlled Density Fill: Controlled density fill shall be placed as shown on the drawings or wherever mechanical compaction cannot be achieved due to physical space and/or clearance limitations (not allowing access for mechanical compaction equipment) and where additional excavation to provide the required space and/or clearance is not practical or possible. CDF shall be used as fill above utilities wherever non-settling backfill is required as directed by the Owner.

3.6 GENERAL COMPACTION REQUIREMENTS

- A. Requirements of this section shall apply unless more stringent requirements are established by the local agency involved.
- B. When working in an existing traveled roadway, restoration and compaction must be achieved as the trench is backfilled so as to maintain traffic.
- C. Trench backfill under roadway shall be mechanically compacted to 95% of maximum density.
- D. In place compaction tests are required, frequency per the local Road Agency. Contractor shall remove and re-compact material that does not meet specified requirements.
- E. When working in areas outside of the right-of-way or on easements, backfill compaction shall be achieved throughout the entire depth of the trench by mechanical compaction to 90% density.

3.7 MECHANICAL COMPACTION

- A. Method of compaction shall be at Contractor's option.
- B. The Contractor shall be responsible to provide the proper size and type of compaction equipment and select the proper method of utilizing said equipment to attain the required compaction density.

3.8 INSULATION BOARD INSTALLATION

- A. Prior to placement of the insulation board, the subgrade shall be leveled and compacted to provide a smooth, firm foundation.
- B. Insulation board shall be placed 12 inches above the pipe line whenever shown on the drawing.
- C. The insulation shall be 2 feet wide and extend 5 additional feet along the length of pipe after minimum cover has been achieved.
- D. Insulation shall be anchored prior to backfilling using a minimum of two 6-inch by 3/8-inch wooden skewers per board, driven at an angle to the vertical and flush to the surface of the insulation.
- E. Layering of insulation to obtain the specified thickness shall be allowed as long as all joints are overlapped at least 6 inches.

3.9 CONTROLLED DENSITY FILL (CDF)

- A. Haul excavated material immediately to waste, install and bed pipe per other applicable sections.
- B. Mix and deliver CDF in commercial concrete ready mix trucks. CDF shall be discharged from the mixer by any reasonable means (which does not segregate the material) into the area to be filled.
- C. Contain CDF at either end of the excavation by bulkhead or earth fill.
- D. Place CDF using suitable equipment to avoid injury to or displacement of installed utility lines, manholes, and other structures. CDF shall not be placed on frozen ground.
- E. Vibrate fill with concrete vibrators during placement for complete consolidation, 95% minimum.
- F. Provide steel plates to span utility trench and prevent traffic contact with the CDF for at least 12 hours, but not more than 24 hours or until fill has set sufficient to prevent rutting.
- G. Placement of CDF shall be scheduled during favorable weather conditions. At the time of placement, CDF must have a temperature of at least 40° F. Mixing and placing shall stop when the temperature is 38° F or less and falling. Each filling stage shall be as continuous an operation as practical.

* * * END OF SECTION * * *

SECTION 02275 SEDIMENTATION CONTROL

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavating, Backfilling and Compacting for Utilities: Section 02222
- B. Landscape Restoration: Section 02990

1.2 QUALITY CONTROL

- A. Conform to regulatory requirements.
- B. Sedimentation control systems depicted on drawings are intended to be minimum requirements to meet anticipated site conditions.

1.3 SCHEDULE

- A. Required sedimentation control facilities must be constructed and in operation prior to land clearing and/or other construction to ensure that sediment-laden water does not enter the natural drainage system or otherwise be discharged from the site.
- B. Sediment facilities shall be maintained in a satisfactory condition until such time that clearing and/or construction is completed and potential for on-site erosion has passed.
- C. The implementation, maintenance, replacement and additions to erosion/sedimentation control systems shall be the responsibility of the Contractor.

2. PRODUCTS

2.1 PLANTING MATERIALS

- A. Refer to Section 02990

2.2 STRAW

- A. Be in an air dried condition free of noxious weeds, weed seeds, and other materials detrimental to plant life.
- B. Be seasoned before baling or loading and shall be acceptable to the Engineer.

2.3 JUTE MATTING

- A. Be of a uniform open plain weave of unbleached, single jute yarn treated with a fire retardant chemical.
- B. The yarn shall be of a loosely twisted construction and shall not vary in thickness by more than 1/2 of its normal diameter.
- C. Furnished in rolled strips 48 inches wide by approximately 50 yards long.
- D. Average weight of 0.92 pounds per square yard with an allowable tolerance of plus or minus 1 inch in width and 5% in weight.

2.4 FILTER FABRIC

- A. Filter fabric for the erosion protection barriers shall be Mirafi 140, or equivalent.

2.5 WIRE

- A. Wire for the erosion protection barriers shall be 2 x 2 mesh, 14 gauge galvanized wire.

2.6 SUPPORT POSTS

- A. Support posts for the erosion protection barriers shall be 2 inch by 4 inch, Doug-FR No. 1 or better wood posts or 1-1/2 inch by 48 inch medium weight steel fence posts.

2.7 CLEAR PLASTIC COVERING

- A. Clear plastic covering for protection of slopes and cuts shall meet the requirements of the NBS Voluntary Product Standard, PS 17 for Polyethylene sheeting having a minimum thickness of 6 mil.

2.8 SEDIMENT RETENTION WATTLE

- A. Wattles shall be a straw-filled tube of flexible netting material exhibiting the following properties. It shall be a machine-produced tube of compacted rice straw that is Certified Weed Free Forage, by a manufacturer whose principle business is wattle

manufacturing. The netting shall consist of seamless, high-density polyethylene and ethyl vinyl acetate and contain ultra violet inhibitors

3. EXECUTION

3.1 EROSION CONTROL

- A. Erosion control provisions shall meet or exceed the requirements of the local agency having jurisdiction.
- B. When provisions are specified and shown on the Drawings, they are the minimum requirements.
- C. Contractor shall not permit sediment laden waters to enter drainage facilities or be discharged from the site.
- D. As construction progresses and seasonal conditions dictate, more siltation control facilities may be required. It shall be the responsibility of the Contractor to address new conditions that may be created and to provide additional facilities over and above minimum requirements as may be required.

3.2 SILTATION/SEDIMENTATION PONDS

- A. Siltation/sedimentation ponds shall be installed on site to de-silt all stormwater or water pumped from excavations.
- B. If additional siltation control is required, check dams or silt fences may be placed in ditches receiving stormwater from areas disturbed by construction.
- C. Siltation/sedimentation ponds shall be constructed in accordance with the requirements of the agencies having jurisdiction over the project area and/or the facilities that will receive discharge from siltation/sedimentation ponds.

3.3 FILTER FABRIC FENCES

- A. Filter fabric fence shall consist of filter fabric fastened to wire fabric with staples or wire rings.
- B. Wire shall be fastened to posts set at 4-foot centers.
- C. Fabric shall be buried into ground approximately 8 inches to prevent silt from washing under fabric.
- D. Fence shall be located to catch silt and prevent discharge to drainage courses.

3.4 STRAW BALE FILTER

- A. Installed in drainage way to catch silt.
- B. Dig bales into ground approximately 6 inches and stake in place with 2 wooden stakes in each bale.
- C. Bales to extend above anticipated surface of stream.

3.5 SEDIMENT RETENTION WATTLE

- A. Install wattles in the trench, insuring that no gaps exist between the soil and the bottom of the wattle. The ends of adjacent wattles should be tightly abutted so that no opening exists for water or sediment to pass through. Alternately, wattles may be lapped, 6" minimum to prevent sediment passing through the field joint.
- B. Wooden stakes should be used to fasten the wattles to the soil. When conditions warrant, a straight metal bar can be used to drive a pilot hole through the wattle and into the soil.

3.6 PLACING JUTE MATTING

- A. Seed and fertilizer shall be placed prior to placing of matting.
- B. Jute matting shall be unrolled parallel to the flow of water. Where more than 1 strip of jute matting is required to cover the given area, it shall overlap the adjacent mat a minimum of 4 inches. The ends of matting shall overlap at least 6 inches with the upgrade section on top.
- C. The up-slope end of each strip of matting shall be staked and buried in a 12-inch wide by 6-inch deep trench with the soil firmly tamped against the mat. Three stakes per width of matting (1 stake at each overlap) shall be driven below the finish ground line prior to backfilling of the trench.

- D. The Engineer may require that any other edge exposed to more than normal flow of water or strong prevailing winds be staked and buried in a similar manner.
- E. Check slots shall be placed between the ends of strips by placing a tight fold of the matting at least 6 inches vertically into the soil. These shall be tamped and stapled the same as upslope ends. Check-slots must be spaced so that one check slot or one end occurs within each 50 feet of slope.
- F. Edges of matting shall be buried around the edges of catch basins and other structures as herein described. Matting must be spread evenly and smoothly and in contact with the soil at all points.
- G. Matting shall be held in place by approved wire staples, pins, spikes or wooden stakes driven vertically into the soil. Matting shall be fastened at intervals not more than 3 feet apart in 3 rows for each strip of matting, with 1 row along each edge and 1 row alternately spaced in the middle. All ends of the matting and check slots shall be fastened at 6-inch intervals across their width. Length of fastening devices shall be sufficient to securely anchor matting against the soil and driven flush with the finished grade.

3.7 PLACING CLEAR PLASTIC COVERING

- A. Clear plastic covering shall be installed on erodible embankment slopes as shown in the plans or as designated by the Engineer.
- B. The clear plastic covering shall be installed immediately after completion of the application of roadside seeding.
- C. The Contractor shall maintain the cover tightly in place by using sandbags or tires on ropes with a minimum 10-foot grid spacing in all directions. All seams shall be taped or weighted down full length. There shall be at least a 12-inch overlap of all seams.
- D. The Contractor shall be responsible to immediately repair all damaged areas.
- E. The clear plastic covering shall be replaced or removed within 6 months of installation.

3.8 EXISTING DRAINAGE FACILITIES

- A. Should a storm sewer or culvert become blocked or have its capacity restricted due to discharge siltation from Contractor's operations, the Contractor shall make arrangements with the jurisdictional agency for the cleaning of the facility at no additional expense to the Owner.

3.9 DRAINAGE DIVERSION

- A. Contractor shall divert the surface runoff water around the site as may be required.
- B. Drainage shall be restored to condition existing prior to construction unless otherwise shown on the Drawings.

* * * END OF SECTION * * *

SECTION 02300 PIPE BORING AND JACKING

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Sanitary Sewers: Section 02730

1.2 REQUIREMENTS OF CONTROLLING AGENCY

- A. All work shall be done in accordance with the requirements of the road or railroad agency in control of the facility being bored or jacked.

2. PRODUCTS

2.1 MATERIALS

- A. All materials selected by the Contractor shall meet the minimum requirements of the controlling agency or the construction requirements.
- B. Where casing size and thickness is shown on drawing it is minimum size and thickness permitted. Contractor is permitted to use larger size or thicker walled casing if in his opinion; it is required because of soil or other job conditions. Contractor shall make his own determination regarding casing requirements.
- C. Minimum thickness of casing wall shall meet requirement of road or railroad agency involved.

3. EXECUTION

3.1 INSTALLATION OF ENCASING PIPE

- A. Where shown on the Plans, the Contractor shall install the pipe in a large encasing pipe.
- B. The encasing pipe shall be installed by jacking, tunneling, augering or by a combination of these methods.
- C. The encasing pipe shall normally extend from ditch line on each side of the pavement or as shown on the drawings or in the road permit. No excavation shall be made closer than 6 feet from the edge of the pavement or as directed by the road or railroad agency. Exact length shall be approved by the road or railroad agency involved.
- D. During jacking, augering, or tunneling operations, care shall be exercised to prevent caving ahead of the pipe which will cause voids outside the pipe. If voids occur, the Contractor shall backpack the voids with sand and pea gravel and fill the voids with a pumped Portland cement grout.

3.2 TUNNELING

- A. Tunneling will not be allowed except by the liner plate method and unless approved by the road or railroad agency involved.
- B. Liner plates shall be assembled and installed in accordance with the manufacturer's instructions and specifications and in accordance with accepted tunneling methods using poling plates or shields of a strength equal to that of the liner plates.

3.3 CARRIER PIPE INSTALLATION

- A. The pipeline shall be skidded into position inside the casing pipe using suitable skids and blocked into position.
- B. The annular space between the carrier pipe and the casing pipe or tunnel liner shall be filled by sluicing or blowing sand or pea gravel into the space unless otherwise specified. Care shall be exercised to ensure that the entire space is filled and that the pipe is not disturbed during the placement of the backfill between the pipe and the casing.
- C. The Contractor shall remove the carrier pipe and reinstall it if the pipe is not within the tolerances shown on the drawings and as specified.

* * * END OF SECTION * * *

SECTION 02575 PAVEMENT REPAIR AND RESURFACING

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Traffic Regulation: Section 01570
- B. Demolition: Section 02050
- C. Site Clearing: Section 02110
- D. Excavation, Backfilling, and Compacting for Utilities: Section 02222

1.2 QUALITY ASSURANCE

- A. Qualifications of Asphalt Concrete Producer: Use only materials which are furnished by a bulk asphalt concrete producer regularly engaged in production of hot mix, hot laid asphalt concrete.

1.3 PAVING QUALITY REQUIREMENTS

- A. General: In addition to other specified conditions, comply with following minimum requirements:
 - 1. Comply with requirements of Road Agency having jurisdiction.
 - 2. Provide final surfaces of uniform texture, conforming to required grades and cross-sections.
 - 3. Patches shall match existing grade and cross-section unless otherwise directed by the Road Agency.
 - 4. Unsatisfactory restoration work shall be redone promptly by the Contractor. This includes immediately replacing failed patches.
 - 5. Cleanup of excavation and debris material shall be accomplished concurrently with the burying operation. At no time shall debris and excavation extend along a line for more than three hundred (300) feet.
 - 6. Any temporary restoration work shall be made permanent within thirty (30) calendar days from the date of the temporary restoration.
- B. Surface Smoothness:
 - 1. Test finished surface of each asphalt concrete course for smoothness, using a 10 foot straight edge applied parallel to and at right angles to centerline of paved areas.
 - 2. Surfaces will not be acceptable if exceeding 0.25 inch in 10 feet unless more rigid requirements are established by the Road Agency.

1.4 SUBMITTALS

- A. Certify that materials comply with specification requirements.
- B. Certificate to be signed by asphalt concrete producer and Contractor.
- C. Submit concrete mix design.

1.5 JOB CONDITIONS

- A. Weather Limitations:
 - 1. Construct only when temperatures are above minimum specified in the Washington Standard Specifications for Road, Bridge, and Municipal Construction – 2012 (hereinafter referred to as WSDOT Standard Specifications) unless waived by Road Agency having jurisdiction.
 - 2. Do not construct pavement or base when the base surface is wet or contains an excess of moisture which would prevent uniform distribution and the required penetration.
- B. Grade Control: Establish and maintain the required lines and grades, including crown and cross-slope, for each course during construction operations.
- C. Traffic Control:
 - 1. Maintain vehicular and pedestrian traffic during paving operations, as required for other construction activities.

2. Provide flagmen, barricades, warning signs, and warning lights for movement of traffic and safety and to cause the least interruption of work.
3. See Section 01570 for additional requirements.

1.6 ROAD AND STREET RESTORATION REQUIREMENTS

- A. Road and street restoration shall be done per City of Shoreline standards and permit requirements.
- B. The Contractor's responsibility as to road restoration shall include, but not be limited to, proper backfill and compaction of excavation, shaping and general restoration of the roadway, restoration of public and private improvements when damaged by construction, restoration of drainage facilities, scarification of existing surfacing, if required, removal of debris and surplus material and all other requirements of these Specifications. In addition, upon completion of the above restoration, backfill gravel or crushed rock shall be placed where required, in the opinion of the Engineer.
- C. Unless otherwise specifically authorized by the authority responsible for the roadway, the final grade and cross-section shall conform to applicable Road Agency standard cross sections. In case of existing private roads, they shall conform to the roadway that existed prior to construction. The removal and disposal of existing materials necessary to fulfill the above requirements shall be considered incidental to the construction and the costs thereof shall be included in the items for which payment is provided.
- D. Manhole rings, valve boxes and monument cases shall be adjusted as necessary to be flush with the restored surface.
- E. The Contractor shall comply with all requirements of all permits for installation of pipelines in authorized right-of-way.
- F. The Contractor will place and maintain sufficient and proper lights and barricades at all locations on roads not accepted by the Road Agency involved.
- G. After completion of pipeline installation the Contractor shall clean up drainage ditches and restore all existing drainage structures that he may have damaged during the course of construction. He shall also comply with all drainage requirements of the agency involved upon which the agency's acceptance of the roads is conditioned.
- H. The Contractor shall restore any private improvement on road right-of-way including, but not limited to, culverts, driveways, curbs, sidewalks, parking strips, parking areas, or other permanent improvements, whether or not a permit for such improvements has been obtained.
- I. On streets where the pipeline is located on the shoulder alongside existing bituminous or concrete surfacing, no payment shall be made for cost of restoring street surfacing which may be damaged by the Contractor's operations. If the Engineer requires crushed rock spread on the shoulder it shall be paid under the crushed rock bid item.
- J. All streets in the construction area as well as any unpaved streets used by Contractor's trucks or any other equipment hauling material to and from the area, whether within the construction area or adjacent thereto, and any unpaved streets used as detours during the construction shall be serviced with self-propelled pickup street sweepers to prevent the transport of sediment and other debris off the project site. Street sweepers shall be designed and operated to meet air quality standards.
- K. It is specifically understood and agreed that the Contractor is responsible for complying with all requirements of the Road Agency necessary to obtain written acceptance of the roads by the agency concerned, and for such work the Contractor will be paid only for the items included in this Contract.
- L. Until accepted in writing by the Road Agency, the Contractor will maintain all roads in a condition satisfactory to the agency concerned. This shall include periodic

grading of all streets on which traffic is allowed wherever in the opinion of the Engineer, such grading is required. A suitable motor grader shall be available for this work.

- M. Any settlement which occurs during the first year after final contract acceptance shall be repaired by the Contractor at his expense.

2. PRODUCTS

2.1 CRUSHED ROCK

- A. Crushed rock shall be as specified in Section 02222.

2.2 HOT MIX ASPHALT

- A. Hot mix asphalt pavement shall conform to the WSDOT Standard Specifications Section 5-04.

2.3 ASPHALT CONCRETE PAVEMENT

- A. Asphalt concrete pavement shall conform to the Technical Requirements of the WSDOT Standard Specifications for plant mix asphalt concrete unless otherwise set forth in the Special Provisions or if superseded by the local Road Agency.

2.4 ASPHALT TREATED BASE

- A. Asphalt treated base shall conform to the Technical Requirements of the WSDOT Standard Specifications for asphalt treated base unless otherwise set forth in the Special Provisions or if superseded by the local Road Agency.

2.5 PAVEMENT MARKINGS

- A. Striping shall be high VOC solvent based paint per WSDOT Standard Specification 9-34.
- B. Crosswalks and stop bars shall be Type B – Preformed Fused Thermoplastic per WSDOT Standard Specification 9-34.

2.6 CONCRETE

- A. Concrete specifications shall meet the requirements of the local Road Agency.

3. EXECUTION

3.1 GENERAL PAVEMENT REPAIR REQUIREMENTS

- A. Pavement patching shall be scheduled to accommodate the demands of traffic and shall be performed as rapidly as possible to provide maximum safety and convenience to public travel.
- B. The placing and compaction of the trench backfill, and the preparation and compaction of the subgrade shall be in accordance with the requirements of Section 02222 of these Specifications.
- C. Prior to trench excavation in pavement surfaces, straight vertical trim lines shall be saw cut in order to minimize breakage and cracking of the remaining surfacing.
- D. Before the patch is constructed all pavement cuts shall be trued so that the marginal lines of the patch will form a rectangle with straight edges and vertical faces.
- E. After completion of the patches, the entire roadway surface shall be cleaned by brooming or such other methods as may be required. The early completion of this phase of the restoration is required, not only to facilitate public relations, control dust and traffic problems, but also to prevent the further break-up and cracking of the existing asphalt mat. If, in the opinion of the Engineer, the Contractor is not diligently pursuing the work in such a manner as to place the patch as soon as reasonably possible, the Contractor may be required to re-trim and remove any and all cracked areas in such a manner to produce a straight uniform edge.
- F. Finished grade and cross section of patch shall match grade and cross-section of existing pavement.
- G. All incidental work required to complete the patching of street surfaces as specified, including joints where required, shall be considered as incidental to the patching and the costs thereof shall be included in the items for which payment is provided.

3.2 ASPHALT PAVEMENT GRINDING

- A. Grinding asphalt pavement shall consist of planing the existing pavement to a depth of two (2) inches in order to provide a smooth transition at edge of the trench restoration paving and the existing pavement. The width of grinding shall be as shown on the drawings.
- B. Grinding shall not precede the trench restoration paving by more than five (5) days (including weekends and holidays). Grindings shall be disposed of in an approved waste site or recycling plant provided by the Contractor.
- C. The Contractor shall provide for safe vehicular travel over existing manholes, valve boxes, catch basin grates, etc., following grinding operations.
- D. Prior to opening to traffic, any delamination of the existing asphalt concrete pavement shall be removed and holes patched with Class A or B asphalt concrete pavement. The surface shall be cleaned by sweeping to remove dust and debris. A vacuum street sweeper with dust suppression shall be present at all times during grinding operations. Damage from pavement grinding beyond the grinding limits shall be repaired by the Contractor at no additional expense to the Owner.

3.3 ASPHALT CONCRETE PAVEMENT TRENCH PATCH

- A. Preparation:
 - 1. After compacting the trench backfill and placing and compacting backfill material, where required, the Contractor shall place and compact crushed rock in the trench area to a minimum depth of twelve (12) inches or depth to match the original cross-section, whichever is greater.
 - 2. A tack coat of asphalt applied at the rate of 0.02 to 0.08 gallon per square yard of retained asphalt shall be applied through the use of mechanical equipment to all surfaces on which any course of asphalt concrete is to be placed or abutted. The spreading equipment shall be capable of uniformly distributing asphalt materials over any area in controlled amounts and shall be equipped with hand operated spray equipment for use only on inaccessible and irregularly shaped areas.
 - 3. The tack coat shall be a heated cutback asphalt, or emulsified asphalt, mixing grade. The emulsified asphalt may be mixed with water at the rate of 1 to 2 parts water to 1 part of emulsified asphalt.
 - 4. If a temporary trench patch has been used it shall be removed and disposed of properly.
- B. Single Lift Patch:
 - 1. Immediately after compacting the base, the Contractor shall place a two-inch minimum thickness of asphalt concrete surfacing.
 - 2. If the existing pavement is more than two inches, the asphalt concrete pavement shall match the compacted thickness of the existing pavement.
 - 3. The edge shall be hand raked to produce a smooth edge where the patch abuts the existing pavement.
 - 4. The thickness shall be adjusted so that a smooth uniform grade exists after rolling.
 - 5. The edge of the patch shall be sealed by painting with a cutback asphalt or CSS-1 emulsion and immediately covered with sand and heated.

3.4 CEMENT CONCRETE PAVEMENT PATCH

- A. After the subgrade for the pavement has been compacted and constructed to line and grade, the cement concrete pavement patch shall be placed, compacted and struck off to the grade of the adjacent pavement.
- B. Minimum thickness shall be eight inches or the thickness of the existing pavement plus two inches, whichever is greater.
- C. Through and dummy joints shall be placed and edged to match existing joints.
- D. The surface shall be finished and brushed with a fiber brush.

- E. Approved curing compound shall be placed on the finished concrete immediately after finishing.
- F. Concrete used in patches shall be in accordance with the requirements of the local Road Agency.

3.5 RIGID TYPE PAVEMENT RESURFACED WITH ASPHALT CONCRETE

- A. Cement concrete patch shall be placed as specified above for cement concrete pavement patch except that the surface of the cement concrete portion of the patch shall be left low enough to accommodate the asphalt portion of the patch. Brush finishing will not be required.
- B. Curing shall be accomplished with an asphalt emulsion cut back with water.
- C. Asphalt concrete or bituminous plant mix shall not be placed until the day after the cement concrete has been placed.
- D. The edges of the existing asphalt pavements and castings shall be painted with hot asphalt cement or asphalt emulsion immediately before placing the asphalt patching material.
- E. The asphalt concrete pavement shall then be placed leveled and compacted to conform to the adjacent paved surface.
- F. All joints between the new and original asphalt pavement shall be painted with hot asphalt or asphalt emulsion and be covered with dry paving sand before the asphalt solidifies.

3.6 ASPHALT CONCRETE PAVEMENT

- A. Full width asphalt concrete pavement shall conform to the Technical Requirements of the standard specifications of the State Highway Department in which the project is located.
- B. After the subgrade has been properly prepared and compacted, a minimum of two inches of Hot Mix Asphalt shall be placed and compacted.
- C. If the existing pavement is more than two inches thick, asphalt concrete shall be of the same depth as existing pavement prior to construction.
- D. The edges of the existing asphalt pavements and castings shall be painted with hot asphalt cement or asphalt emulsion immediately before placing the asphalt patching material.
- E. The asphalt concrete pavement shall then be placed, leveled, and compacted to conform to established cross-section and grade and to match adjacent paved surface.
- F. The edge of the new pavement shall be sealed by painting with a cutback asphalt or CSS-1 emulsion and immediately covered with sand and heated.

3.7 ASPHALT CONCRETE OVERLAY

- A. Before construction of an asphalt concrete pavement overlay on an existing surface, all fatty asphalt patches, grease drippings, and other objectionable matter shall be removed from the existing pavement. Excess asphalt joint filler shall be removed and pre-molded joint filler shall be removed to at least ½ inch below the surface of the existing pavement. Existing pavement or bituminous surfaces shall be thoroughly cleaned by sweeping to remove dust and other foreign matter.
- B. Prior to placing asphalt concrete, a tack coat shall be applied using heated cut back asphalt or emulsified asphalt at the rate of 0.02 to 0.05 gallons per square yard.
- C. When the surface of the existing pavement or old base is irregular, it shall be brought to uniform grade and cross section as required by the Road Agency involved. Pre-leveling of uneven or broken surfaces over which asphalt concrete is to be placed is required and may be accomplished by the use of asphalt concrete placed with a motor patrol grader, a paving machine, by hand raking, or by a combination of these methods. After placement, the asphalt concrete used for pre-leveling shall be compacted with rollers.

- D. When asphalt concrete pavement is to be constructed over an existing paved or oiled surface, in addition to the preparation as outlined hereinbefore, all holes and small depressions shall be filled with an appropriate class of asphalt concrete mix. The surface of the patched area shall be leveled and compacted thoroughly. All previous patches that have settled shall be pre-leveled so that depth of overlay does not exceed two inches in thickness.
- E. After preparation of the base a one inch minimum compacted full width layer of asphalt concrete shall be placed on top of an existing paving surface. Surfacing shall be placed in such a manner as to prevent disturbing existing drainage. Surfacing shall be feathered out as required to meet existing driveways, catch basins, traffic control pads, street intersections, etc., and shall include thickened edge paving where it is now existing.
- F. The edges of the overlay shall be sealed by painting with a cutback asphalt or CSS-1 emulsion and immediately covered with dry sand and heated.

3.8 BITUMINOUS SURFACE TREATMENT REPLACEMENT

- A. Unless otherwise specified, all light bituminous surface treatment shall be replaced with a one inch asphalt concrete overlay over a crushed rock base.
- B. Base shall consist of four inches of crushed rock.

3.9 CRUSHED ROCK

- A. Existing crushed rock shall be replaced with new material.
- B. Thickness of course shall be as directed by the Owner.
- C. When the utility line is along the shoulder of a roadway, the Contractor may be directed to place a course of crushed rock along shoulder of the roadway. Thickness shall be as required by the Road Agency.
- D. During dry periods, the Engineer may require water sprinkling prior to and during the placement of crushed rock. The cost of such sprinkling shall be included in the unit bid for crushed rock.

3.10 TEMPORARY TRENCH PATCH

- A. The Contractor may be required to furnish and install a temporary trench patch only when specifically directed by the Owner or as provided on the Plans.
- B. Area to be patched shall be cleaned out and graded to the bottom of the base course. Any loose asphalt shall be removed.
- C. Place a patch consisting of 2-inch minimum course of crushed rock base and a 2-inch minimum course of cold asphalt plant mix placed over the trench area.
- D. Both the base and surface course shall be placed and compacted so that the finished surface will match the grade and cross-section of the existing pavement.
- E. Surface of pavement shall be cleaned of all dirt and debris before opening to traffic.
- F. The Contractor shall maintain temporary patch until the permanent patch is installed.

3.11 CEMENT CONCRETE CURBS AND GUTTERS

- A. The concrete in the curbs and gutters shall be air entrained concrete in accordance with the requirements of the WSDOT Standard Specifications for Road Bridge and Municipal Construction Section 8-14 (current edition).
- B. Side forms shall rest throughout their length on firm ground and shall be full depth of the curb. They shall be either metal of suitable gauge for the work or surfaced "construction" grade lumber not less than two (2) inches (commercial) in thickness. Forms shall be cleaned and well oiled prior to use. Forms used more than one time shall be cleaned thoroughly and any forms which have become worn, splintered, or warped shall not be used again. Forms shall be adequately supported to prevent deflection or movement.
- C. The foundation shall be watered thoroughly before the concrete is placed.
- D. Concrete shall be well tamped and spaded or vibrated in the forms.

- E. Exposed surfaces shall be finished full width with a trowel and edger. Remove forms of all roadway face of curbs within 24 hours of placement of concrete and treat with a float finish. The curb and gutter finish shall meet the Road Agency requirements.
- F. Joints shall be spaced to match joints in the abutting pavement. If the abutting pavement is not jointed or the curb or gutter is not abutting pavement, joints in the curb and gutter shall be spaced at 15 foot intervals. These joints shall be 1/8 inch minimum thickness and constructed to a minimum depth of 1 inch by sawing or scoring with a tool which leaves the corners rounded and destroys aggregate interlock to a depth specified. Expansion joints, filled to full cross-section with filler 1/4 inch thick shall be placed in the curb and gutter to match joints in the abutting pavement, at structures, curb returns and where shown in the plans.
- G. Cure for 72 hours by method acceptable to Road Agency.
- H. Curb and gutter may be constructed by the use of slip form equipment provided the completed curb or gutter retains its shape, grade, and line. Finishing, joints, and curing shall be as provided above.
- I. Top of the form shall not depart from grade more than 1/8 inch when checked with a 10 foot straight edge. Alignment shall not vary more than 1/4 inch in 10 feet.

3.12 ASPHALT CONCRETE CURBS AND GUTTERS

- A. Placed, shaped and compacted true to line and grade, with machine capable of shaping and compacting the materials, to the required cross-section.
- B. Provide tack coat of asphalt applied to the surface upon which asphalt concrete curb is to be placed immediately prior to placing of curb.

3.13 CEMENT CONCRETE SIDEWALKS

- A. The concrete in the sidewalks shall be air entrained concrete in accordance with the requirements of the WSDOT Standard Specifications Section 8-14.
- B. Forms shall be of wood or metal and shall extend for the full depth of the concrete. All forms shall be straight, free from warp and of sufficient strength to resist the pressure of the concrete without springing. Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal.
- C. The foundation shall be brought to the grade required and well wetted before placing the concrete.
- D. Place concrete in the forms and strike off with a heavy iron shod straight edge, trowel surface smooth with a steel trowel as soon as surface can be worked. After troweling and before jointing or edging, the surface of the walk shall be lightly brushed in a transverse direction with a soft brush. On grades of over 4%, the surface shall be finished with a stipple brush.
- E. Joints shall be constructed at the locations and of the sizes as required by the Road Agency.
- F. Cured for at least 72 hours by means of moist burlap or quilted blankets. Exclude all traffic, both pedestrian and vehicular, during curing period.

3.14 TRAFFIC LOOP DETECTORS

- A. Materials
 - 1. Electrical conductors shall conform to the requirements of Section 9-29.3 **Conductors, Cable** of the WSDOT Standard Specifications, unless otherwise noted. Electrical wiring shall conform to the requirements of Section 8-20.3(8) **Wiring** of the WSDOT Standard Specifications.

2. Loop wire shall be No. 12 AWG Class B stranded copper wire with cross-linked polyethylene type USE insulation. Loop lead-in wire shall be IMSA Loop cable specification 50-2-1984, # 14 AWG.
 3. A one-part loop sealant manufactured by Craftco "MSI", or prior approved equal, shall be used to imbed the loop wire into the pavement. The sawcut shall be filled with the loop sealant to within 1/16 inch of the top of the pavement. All sealant shall be installed per manufacturers specifications and accommodations.
 4. It shall be the responsibility of the Contractor to connect the loop wires to the lead-in cable using approved splice method. Loop wires shall be connected to the lead in cable using uninsulated butt splices. The connection shall then be encapsulated using approved "filled" heat shrinkable, thin wall flexible polyolefin tubing. The Road Agency Signal Technician will be available to indicate the approximate location of existing lead-in cables to be used.
- B. Construction Requirements
1. General
 - a. Loops shall be installed after final pavement overlays. Loops shall conform to Section 8-20.3(14)C **Induction Loop Vehicle Detectors** as shown in Appendix A of the WSDOT Standard Specifications.
 - b. All saw cuts shall be cleaned with pressurized water (1400 psi) and then blown dry with heated pressurized air (100 psi) prior to the installation of wire. Care must be taken when inserting wire. Only wooden tools shall be used to push wire into the saw cuts. All loops shall have the number of turns shown on the wiring details in Appendix A of the WSDOT Standard Specifications. Lead-ins from loops to junction boxes shall be twisted two turns per foot.
 - c. All costs associated with sawcutting for loops shall be considered **incidental** to and included in the unit contract prices for "Loop Detectors" set forth in the Proposal/Construction Contract.
 - d. To prevent intersections from running "fixed time" longer than necessary, the Contractor shall connect detectors as soon as possible after saw cutting. The maximum amount time allowable between cutting the loop and reconnecting the traffic signal loop shall be 7 calendar days.
 - e. Multiple installations of lead-in wire shall not be considered additional length.
 - f. Loop wires shall be connected to the lead-in cable using uninsulated butt splices. The connection shall then be encapsulated using approved heat shrinkable, thin wall, flexible, Polyolefin tubing.
 - g. All loops are to be individually wired and shall be returned to the nearest junction box where loops shall be spliced to the existing lead-in cable as directed by the Engineer. If no lead-in cable exist at the junction box, the Contractor shall furnish and install lead-in cable from the junction box to the controller. Controller connections shall be made under the direction of the Engineer.
 - h. If existing loops which are to remain are damaged by the Contractor, they shall be replaced at the Contractor's expense. The Contractor may, at his own expense, install new conduit from the existing junction boxes to the edge of pavement as an alternative to finding the existing conduit.
 2. Testing
 - a. Loop installations shall be tested in accordance with Section 8-20.3(14)D **Test for Induction Loops and Lead-In Cable** of the WSDOT Standard Specifications. In addition, **PRIOR TO** installing the loop sealant material the Contractor shall perform the required inductance testing. The inductance of the loop shall be measured and the inductance reading shall not be less than 60 nor greater than 120 microhenries. After the sealant has been installed

and prior to connection to the lead-in cables, the inductance shall be measured again. If any of the installations fail to pass all specified tests, the installation shall be repaired or replaced and retested until satisfactory results are obtained. This testing is to be performed by the Contractor with the results submitted to the Engineer on the sheets provided in Appendix A of the WSDOT Standard Specifications prior to signal turn-on.

3.15 PAVEMENT MARKINGS

- A. Install pavement markings per WSDOT Standard Specification 8-22.
- B. The Contractor shall restore any and all reflective and non-reflective pavement striping and traffic buttons damaged during construction under this Contract.
- C. Restoration shall be in accordance with the current standards of the Road Agency involved.
- D. Prior to installing pavement markings the Contractor shall pre-mark the layout of all channelization and receive approval from the Engineer. Pre-marks shall consist of painted spot markings. The Contractor shall notify the Engineer of his/her intention to receive approval of the pre-mark channelization at least **48 hours in advance**.

3.16 ADJUSTING MANHOLES TO GRADE

- A. The Contractor shall adjust manhole castings to final grade by adding concrete rings and/or mortar under the casting and patching with asphalt concrete. Paving adjusting rings will not be used unless specifically authorized by the road agency.
- B. The Contractor shall exercise extreme care in preventing foreign material from entering the manhole.
- C. All manholes shall be adjusted to grade after the asphalt concrete surfacing has been placed. Disturbed area around cover shall be patched and sealed to the satisfaction of the Road Agency having jurisdiction.
- D. The Contractor shall take care not to extend the manholes above finished grade.
- E. In concrete pavement areas, castings shall be adjusted to grade prior to concrete placement.

3.17 ADJUSTING MONUMENT CASES AND VALVE BOXES TO GRADE

- A. Monument cases and/or valve boxes shall be adjusted to final grade and patched with asphalt concrete or cement concrete to match the roadway material and as designated by the Road Agency.
- B. Adjustment shall be made after the resurfacing.
- C. Patching around monument cases and/or valve boxes shall be done to the satisfaction of the Road Agency having jurisdiction.
- D. Valve boxes shall be adjusted to the satisfaction of the utility having jurisdiction.
- E. The Contractor shall take care not to extend the monument cases and/or valve boxes above the finished grade.
- F. In concrete pavement areas, castings shall be adjusted to grade prior to concrete placement.

* * * END OF SECTION * * *

SECTION 02605 MANHOLES AND CLEANOUTS

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Shoring: Section 02150
- C. Excavating, Backfilling and Compacting for Utilities: Section 02222
- D. Sanitary Sewer: Section 02730

1.2 QUALITY ASSURANCE

- A. Testing By Manufacturer:
 - 1. Manufacturer shall test all material as required by these Specifications and the Standards referenced.
 - 2. Manufacturer shall submit to the Engineer two (2) copies of all test results which shall include a certification that materials to be delivered are represented by the samples tested and that such delivered materials meets or exceeds the specification requirements.
 - 3. No material shall be delivered until test results and certifications are in the possession of the Engineer.
 - 4. The Engineer shall have free access to all testing and records pertaining to materials to be delivered to the job site.
 - 5. The Engineer may elect to be present at any or all material testing operations.

2. PRODUCTS

2.1 PRECAST MANHOLES

- A. Precast concrete manholes shall conform to the requirements of ASTM C478 except as specifically modified herein.
- B. Joints between precast elements used for sanitary sewers shall be tongue and groove designed to accommodate a rubber gasket joint similar to pipe joints conforming to ASTM C443. Design of joints shall be approved by the Engineer before manufacture. Shop drawings shall be submitted for review. Variations in joint dimensions shall meet the gasket design requirements but shall in no case be more than the minimum requirement of ASTM C478.
- C. Joints between precast sections used for storm sewers may be rubber gasketed or cement mortar.
- D. Base sections shall be made with the base slab integral with the wall in such a manner to achieve a completely watertight structure. Design of base shall be in accordance with the following table for all manholes up to 25 feet deep using Grade 60 reinforcing steel.

Manhole Inside Diameter	Minimum Base Thickness	Minimum Steel-Sq.In/LF Both Directions	
		Separate Base	Base Integral With Wall
48"	6"	0.23	0.15
54"	8"	0.19	0.19
72"	8"	0.35	0.24
96"	12"	0.39	0.29

- E. Proportion of Portland cement in concrete mixture shall be not less than 564 pounds per cubic yard of concrete.
- F. Openings to receive pipes shall be circular, and shall be sized as required for the specified pipe entry coupling.
- G. Cones with diameter at small end of 36 inches shall be not less than 24 inches in height. Cones with a diameter at the small end of 24 inches shall be not less than

17 inches in height.

- H. The openings in the top slab shall be eccentrically located so as to provide at least 6 inches minimum radial distance from the edge of the opening to the outer edge of the slab but not more than 2.5 inch off-set distance from the edge of the opening to the inside face of the standard section.
- I. Unless otherwise provided, steps shall be installed in each section so that sections placed together in any combination will provide a continuous vertical ladder.

2.2 MANHOLE PIPE ENTRY COUPLINGS

- A. Manhole entry coupling for PVC pipe connections to manholes shall provide a watertight joint and utilize a rubber ring to seal against the pipe. The coupling's exterior surface shall be sand impregnated epoxy or similar rough surface to insure adhesion with the mortar.
- B. Resilient connectors conforming to ASTM C923 may be used at the Contractor's option. Such connectors shall not be cast-in-place in precast structures.
- C. Manhole pipe entry couplings shall be compatible with HDPE pipe in locations where HDPE is connected directly to the manhole.

2.3 DROP MANHOLES

- A. Drop manholes shall be an inside drop or outside drop as specified and constructed in accordance with the Standard Details.
- B. One length of ductile iron pipe shall be provided outside the manhole, to reach original solid bearing ground.
- C. An outside drop manhole shall be fabricated with the drop outside the manhole section as shown on the details.
- D. An inside drop shall be fabricated with polyvinyl chloride pipe as shown on the details.

2.4 MANHOLE STEPS AND LADDER

- A. Conform to applicable requirements of ASTM C478 and as shown on the details.
- B. Conform to OSHA or WISHA requirements, whichever is more stringent.
- C. Designed so that foot cannot slide off the ends.
- D. Vertical spacing at 12 inches.
- E. Project uniformly inside wall.
- F. Be deformed bar conforming to ASTM A615, intermediate or standard grade, hot bent and galvanized after bending. For bending, the temperature shall be at least 1600°F. Galvanizing shall conform to ASTM A123. As an alternative, steps may be steel reinforced polypropylene. The reinforcement shall be ½ inch Grade 60 deformed reinforcing bar per ASTM A-615. Polypropylene shall conform to ASTM D-4101.
- G. Design utilizing other materials or shapes that conform to the requirements of this specification may be used upon written approval of the Engineer.
- H. Step dimensions and pattern shall conform to the details.
- I. Ladders: Base sections of precast manholes may be provided with a ladder made of aluminum or steel galvanized after fabrication, as shown on the Standard Details. Ladder shall be adjusted so that it is in line with manhole steps above and extends out the same distance from the wall as the steps above. Ladder shall be securely imbedded and grouted into channel shelf. As an alternative, ladder may be steel reinforced polypropylene. Ladder rungs shall be reinforced with 1/2 inch Grade 60 reinforcing bar per ASTM A-615. Ladder rails shall be reinforced with 9/16 inch cold drawn bar per ASTM C-1018. Polypropylene shall conform with ASTM D-4101.

2.5 CAST METAL FRAMES AND COVERS

- A. Conform to Manhole Frame and Cover Detail
- B. Frames shall be gray-iron conforming to the requirements of AASHTO M105 (ASTM A48), Grade 30B. Covers shall be ductile iron conforming to ASTM A536, Grade 80-55-06.
- C. Be free of porosity, shrink cavities, cold shuts, or cracks or any surface defects which would impair serviceability.
- D. Repair of defects by welding or by the use of "smooth-on" or similar material will not be permitted.
- E. Manufacturer shall certify that the product conforms to the requirements of these specifications.
- F. Apply a bituminous coating to all surfaces. The finished coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun, and shall be strongly adhered to the casting.
- G. The Owner shall have the right to require inspection and approval of all castings prior to painting.
- H. Machine finish the horizontal seating surface and inside vertical recessed face of the frame, and the horizontal seating surface and vertical outside edge of the cover to the following tolerances.
 - 1. Frame $+3/32$ inch to $-3/32$ inch. Cover $+3/32$ inch to $-3/32$ inch.
 - 2. Cover shall not rock when it is seated in any position in its frame.
 - 3. There shall be not more than $3/16$ of an inch side play in any direction between the cover and the frame when any cover is placed in any position in its frame. All covers shall be interchangeable within the dimensions shown on the details.
- I. All frames and covers shall be identified by the name or symbol of the manufacturer in a plainly visible location when the frame and cover is installed. In addition to the manufacturer's identification, when ductile iron is furnished, the material shall be identified by the notation "DUC" or "DI". The manufacturer's identification and the material identification shall be adjacent to each other and shall be minimum 1/2-inch to maximum 1-inch high letters recessed to be flush with the adjacent surfaces.
- J. Cover shall have type of service indicated on cover with two inch raised letters such as WATER, SEWER OR DRAIN.
- K. Cover shall be the bolt-down type with separate provision for lifting/removal per detail.
- L. Provide three (3) stainless steel allen head bolts and one pick hole bolt and nut per owner standard.

2.6 CLEANOUT FRAMES AND COVERS

- A. Conform to Sewer Cleanout Detail

2.7 MANHOLE COLLAR

- A. Manhole collar shall be constructed of concrete with 3,000 psi concrete prepared from ASTM C150 Type I or II Portland cement or of cold mix asphaltic concrete.
- B. Collar shall extend vertically from grade (top of cover elevation) to bottom of highest adjustment ring. Collar shall extend a minimum of 12 inches measured radially beyond the manhole cover frame.

2.8 MANHOLE REHABILITATION WITH CEMENT GROUTING (INTERIOR)

- A. Cementitious grout for joint, gap and leak sealing/repair shall be a low shrink, fiber reinforced, high bond strength, low chloride penetration, chemically durable cement material specifically formulated for stopping water and infiltration/inflow, Xypex Megamix II or approved equal.

3. EXECUTION

3.1 MANHOLE INSTALLATION

- A. Manholes shall be constructed of precast units and/or cast-in-place concrete.
- B. Foundations:
 - 1. Adequate foundations for all manhole structures shall be obtained by removal and replacement of unsuitable material with well graded granular material, or by tightening with coarse ballast rock, or by such other means as provided for foundation preparation of the connected sewers.
 - 2. Where water is encountered at the site, all cast-in-place base or monolithic structures shall be placed on a one-piece waterproof membrane to prevent any movement of water into the fresh concrete.
 - 3. Place base on gravel bedding not less than 4 inches in thickness and extending to the limits of the excavation.
 - 4. Gravel shall be firmly tamped and made smooth and level to assure uniform contact and support of the precast elements.
- C. Precast Base Section:
 - 1. Place on the prepared bedding so as to be fully and uniformly supported in true alignment.
 - 2. Make sure that all entering pipes can be inserted on proper grade.
- D. Cast-in-Place Bases:
 - 1. At least 6 inches in thickness.
 - 2. Extend at least 6 inches radially outside of the manhole wall.
 - 3. Concrete shall have minimum of 4000 psi 28-day compression strength.
 - 4. Place first precast section on the cast-in-place base structure before the base has taken initial set and adjust to true grade and alignment with all inlet pipes installed so as to form an integral, watertight unit or mortar the section into a suitable groove provided in the top of the cast-in-place base.
 - 5. The first section shall be uniformly supported by the base concrete, and shall not bear directly on any of the pipes.
- E. Precast Sections:
 - 1. Placed and aligned to provide vertical sides and vertical alignment of the ladder rungs.
 - 2. The completed manhole shall be true to dimensions, and watertight.
 - 3. Lift holes and manhole joints shall be thoroughly wetted and then be completely filled with mortar, smoothed and pointed both inside and out to ensure water tightness.
 - 4. Steel loops must be removed and the remaining void shall be covered with mortar, smoothed and pointed.
- F. Pipe Connections:
 - 1. Provide flexible joint at a distance from the face of the manhole of not more than 1-1/2 times the nominal pipe diameter or 12 inches, whichever is greater, for all rigid pipes entering or leaving any manhole.
 - 2. No flexible joint shall be placed within 10 feet of the manhole wall, when flexible pipe is used.
 - 3. Firmly compact bedding under pipe within the area of the manhole excavation.
 - 4. Openings through which pipes enter the structure are completely and firmly rammed full of mortar to ensure water tightness.
 - 5. Provide a watertight joint where flexible PVC pipe enters the manhole wall by utilizing a manhole entry coupling that is mortared into the wall. Where resilient connectors are used, the Contractor shall extend the channel into the connector to insure pipe support and a watertight joint. Resilient connectors shall be

installed in accordance with the manufacturer's requirements.

G. Channels:

1. Constructed in field.
2. Conform accurately to the sewer grade and bring together smoothly with well rounded junctions.
3. Channel sides shall be carried up vertically to the crown elevation of the various pipes.
4. Shelf between channels shall be constructed with concrete and smoothly finished and warped evenly with slopes to drain.

H. Manhole Cover:

1. Final elevation and tilt of cover shall conform to the restored street surface unless otherwise specified.
2. Warping of surfacing to meet grade of castings will not be allowed.
3. Provide not less than 4 inches or more than 16 inches of grade rings between the top of the cone or slab and the underside of the manhole frame for adjustment of the frame to street grade or ground surface.
4. Both inside and outside of the grade rings shall have a smooth uniform mortar finish to ensure a watertight seal.

I. Backfill:

1. Extend around manhole and at least one pipe length into each trench.
2. Hand place and tamp gravel bedding up to an elevation of six inches above the crown of all entering pipes.

J. Manhole Collar:

1. Contractor shall install either a concrete or asphalt collar of sufficient size around the neck and frame to hold assembly in place in non-paved traffic areas.

3.2 CONNECTIONS TO EXISTING MANHOLES

- A. The Contractor shall verify the existing manhole invert elevations prior to construction.
- B. Excavate completely around the existing manhole to ensure against unbalanced loading on the manhole.
- C. Keep the manhole in operation at all times and take precautions necessary to prevent any debris or other materials from entering the sewer.
- D. Contractor may be required to install a tight pipeline bypass through the existing channel. If the connection is to a dead end manhole, the outlet shall be plugged watertight with a metal mechanical screw type plug. Plug shall be secured to the ladder with a rope or chain.
- E. Bring laterals into the existing manhole so that the crowns of the two incoming pipes are at the same elevation unless otherwise specified.
- F. Reshape the existing base to provide a channel equivalent to that specified for a new manhole.
- G. The Contractor shall be responsible for repairing all damage to the manholes resulting from his operations.

3.3 CLEANOUTS

- A. Sewer cleanouts shall be constructed as shown on the standard plan.
- B. All materials incorporated into the cleanout structure shall meet the requirements of the various applicable sections of these specifications.
- C. Pipe joints shall be the type specified for sewer pipe used.
- D. The trench excavation shall be made in such a manner as to provide an undisturbed base upon which the pipe shall be placed.
- E. Bedding around and under the pipe shall be tamped.

3.4 GROUTING EXISTING MANHOLES (INTERIOR)

- A. The Contractor is responsible for verifying conditions of manholes identified for rehabilitation prior to bidding
- B. Application of grouting material shall be performed by a workman with appropriate experience.
- C. Plug or place covers over all pipe openings to prevent extraneous material from entering the sewer system.
- D. All foreign material shall be removed from the area to be grouted using a high pressure water spray (maximum 5,000 psi). The surface profile created by high pressure washing shall be per the manufacturer's recommendation.
- E. Loose or protruding concrete shall be removed by using a mason's hammer and chisel. The surface to be repaired must be clean and free of any loose materials.
- F. Wetness (moisture content) and pH of the repair surface shall be per the manufacturer's recommendation.
- G. Grout and stop all active leaks, grout areas with evidence of leaking and grout interior areas with potential for leaks (i.e. manhole joints, necks, inlets). Handling, mixing, placing and finishing shall be per the manufacturer's recommendation.
- H. Grout shall have reasonably uniform thickness and smooth finish.
- I. After the specified sealing and repair work has been completed, the manholes will be visually inspected by the Owner to confirm if acceptable. All rehabilitated manholes shall be re-inspected for leaks at the end of one year warranty period. If leaks are present they shall be resealed as necessary at no additional cost to the Owner.

* * * END OF SECTION * * *

SECTION 02610 PIPE AND FITTINGS

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Excavating, Backfilling and Compacting for Utilities: Section 02222
- C. Sanitary Sewers: Section 02730

1.2 QUALITY ASSURANCE

- A. Testing by Manufacturer:
 - 1. Manufacturer shall test all materials as required by these Specifications and the standards referenced.
 - 2. Manufacturer shall submit to the Engineer two (2) copies of all test results which shall include a certification that materials to be delivered are represented by the samples tested and that such delivered materials meet or exceed the specification requirements.
 - 3. No material shall be delivered until test results and certifications are in the possession of the Engineer.
 - 4. Engineer shall have free access to all testing and records pertaining to material to be delivered to the job site.
 - 5. The Engineer may elect to be present at any or all material testing operations.
- B. Joint tests are intended for qualification of joint design and shall be considered to be a qualification test to establish the adequacy of the manufacturer's joint design. The manufacturer shall certify that tests have been performed within the last year with pipes equivalent in size and design and that they have passed the test enumerated in the specifications. Tests may be waived for pipes of different strength class if joint design is the same as the pipe tested.
- C. Qualifications:
 - 1. HDPE pipe jointing shall be performed by personnel trained in the use of thermal butt-fusion or sidewall fusion equipment. Personnel directly involved with installing HDPE pipe shall receive training in the proper methods for handling and installing the HDPE pipe.
 - 2. Each thermal butt-fusion or sidewall fusion machine operator shall demonstrate his ability prior to insertion operations by fusing two pieces of pipe together in the presence of the Engineer. A fused joint with a minimum of 6 inches of pipe on either side shall be furnished to the Engineer for testing as the Owner may elect. The cost for any testing of the joint shall borne by the Owner.

1.3 SUBMITTALS

- A. The Contractor shall submit the following to the Owner within ten calendar days of the award date of the contract, or as otherwise noted:
 - 1. Manufacturer certification that all furnished material is manufactured, sampled, tested and inspected in accordance with these specifications. An authorized agent of the manufacturer shall sign the certification.
 - 2. Manufacturer's literature for all pipe, fittings, couplings, adapters, and other materials to be furnished for the project.
 - 3. Fusion machine operators shall have attended and successfully completed a training course sponsored by the pipe manufacturer. A written copy of such training certification shall be provided to the Engineer with the installation plan and schedule.

2. PRODUCTS

2.1 HIGH DENSITY POLYETHYLENE (HDPE) PIPE/FITTINGS

- A. All pipe/fitting sizes shown on plans are iron pipe size diameters unless otherwise indicated.
- B. Unless otherwise specified, all HDPE pipe/fittings shall have a minimum standard dimension ratio (SDR) of 17.
- C. HDPE pipe/fittings shall be co-extruded from PE 3608 or PE 4710 virgin resins meeting the specifications as defined in ASTM D3350. Pipe shall be manufactured in accordance with AWWA C906 and ASTM F714.
- D. HDPE pipe/fitting material shall be high-density, extra-high molecular weight polyethylene pipe conforming to ASTM D3350 with a cell classification of 345464C.
- E. Additives may be used provided pipe/fittings still meet the requirements of ASTM D2837.
- F. Pipe/fittings shall contain no recycled compound except that generated within the manufacturer's own plant from resin meeting the same specifications from the same raw material supplier.
- G. Pipe/fittings shall be manufactured in accordance with AWWA C906 and ASTM F714. Lettering shall be legible and permanent under normal conditions of handling and storage. Pipe/fittings shall be clearly and frequently marked with the following information:
 - 1. Name/trademark of pipe manufacturer.
 - 2. Nominal pipe size.
 - 3. Standard Dimension Ratio (SDR).
 - 4. PE 3608 or PE 4710.
 - 5. Manufacturing standard reference.
 - 6. Production code from which date and location of production can be determined.
 - 7. Nominal pressure.
 - 8. Raw material.
- H. Gasketed electrofusion HDPE sewer saddles shall be per ASTM F1055 for use with pipe conforming to ASTM D2513/3035, F714 and with butt fittings conforming with ASTM D3261 as applicable. Saddles shall be produced with PE 3608 or PE 4710 grade polyethylene resin which complies with ASTM D3350.

2.2 FLEXIBLE COUPLINGS

- A. Use for connection between plain end pipe of same or different material.
- B. Sleeve: Gray iron ASTM A126 Class B or ductile iron ASTM A536. Ends have a smooth inside taper for uniform gasket seating.
- C. Followers: Ductile iron ASTM A536.
- D. Gaskets: Grade 30 specially compounded rubber of all new materials.
- E. Bolts and nuts: High strength low alloy steel with heavy, semi-finished hexagon nuts to AWWA C111 (ANSI-A21.11).

2.3 POLYVINYL CHLORIDE (PVC) SEWER PIPE

- A. Conform to ASTM D3034, SDR 35, or ASTM F789.
- B. Joints shall conform to ASTM D3212 using a restrained rubber gasket conforming to ASTM F477.
- C. Fittings shall be injection molded tees or factory solvent welded saddle tees. Fittings for transition from HDPE to PVC shall include restrained rubber gasket and shall be specifically fabricated for watertight joints for the type of pipes to be joined. Saddles fastened to pipe with external bands are not acceptable on any new system, unless specifically approved by the Engineer.
- D. All PVC sewer pipe shall be considered flexible conduit.
- E. Size of PVC sewer pipe shall not exceed 12 inches.

2.4 TEE FITTINGS FOR SEWERS

- A. Unless otherwise specified, all tee connections shall be 6 inches inside diameter and shall be factory made.
- B. All fittings shall be the same material as the pipe, unless otherwise specified. Cast iron fittings may be used for ductile iron pipe.
- C. Fittings shall have sufficient strength to withstand handling and load stresses normally encountered.
- D. All fittings shall be sealed with plugs of same material as the pipe and gasketed with the same gasket material as the pipe joint.
- E. Tees placed on existing concrete, AC, CI or PVC pipe shall be Romac "CB" saddle with stainless steel strap or approved equal. Existing pipe shall be core drilled.

2.5 RESTRAINED COUPLINGS

- A. Flange adapters shall be made of ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible with ANSI/AWWA C110/A21.10.
- B. Restraint for the flange adapter shall consist of a plurality of individual actuated gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial set of gripping wedges.
- C. The flange adapters shall be capable of deflection during assembly or permit lengths of pipe to be field cut to allow a minimum 0.6" gap between the end of the pipe and the mating flange without affecting the integrity of the seal.
- D. For Ductile Iron pipe, the flange adapter shall have a safety factor of 2:1 minimum.
- E. The flange adapter shall be the SERIES 2100 MEGAFLANGE adapter as produced by EBAA Iron, Inc., or approved equal.

2.6 SIDE SEWER COUPLINGS

- A. Side sewer couplings shall be PVC gasketed adapters (IPS x SDR 35) or approved equal.
- B. Side sewer couplings at building connections shall be PVC gasketed adapters (IPS x SDR 35), Fernco Strong Back RC Series Repair Couplings or approved equal.

2.7 SEWER MAIN CONNECTION FITTINGS

- A. Sewer main connection fittings shall be used to connect all HDPE pipe with similar diameters.
- B. All sewer main connection fittings shall be PVC gasketed adapters (IPS x SDR 35).
- C. Contractor may submit alternative fittings to the Owner rather than utilize the fittings listed above. Use of alternative fittings shall not be allowed without prior acceptance from the Owner on a case-by-case basis.

2.8 DETECTABLE LOCATOR TAPE

- A. The tape shall consist of a minimum 4.0 mil thickness, inert polyethylene plastic which is impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil, with a minimum 1/3-mil metallic foil. The tape shall be at least three inches (3") in width and shall be solid blue with identifying print in black letters. The tape shall have printed thereon the following or similar as commercially available:

"CAUTION - BURIED SEWER LINE BELOW"

The identifying lettering shall be minimum 1" high and repeated continuously the full length of the tap. In no instance shall the spacing of the individual segment of the identifying message be greater than eighteen inches (18").
- B. Detectable locator tape shall be installed 18 inches above the pipe it identifies. The backfill shall be sufficiently leveled so that the tape will be installed on a flat surface. The tape shall be centered in the trench and laid flat with printed side up. Caution shall be exercised to avoid displacement of tape and to ensure its integrity. The remainder of the trench is then backfilled in accordance with applicable specifications.

3. EXECUTION

3.1 INSTALLATION

- A. Install pipe in accordance with specification section for pipeline being installed.

3.2 FUSION JOINING HDPE

- A. All HDPE pipe shall be joined by thermal butt-fusion or sidewall fusion per manufacturer's recommendations and ASTM D2657. The pipe manufacturer shall submit a certificate of compliance stating that the proposed fusing equipment is in compliance with their requirements.
- B. Contractor shall identify means of joining one pipe to another and details for installation prior to beginning work. Joining and installation details shall be subject to the Owner's approval. Threaded or solvent-cement joints and connections are not permitted.
- C. Joints shall have weld strength equal to or greater than the tensile strength of the pipe/fittings. All joints shall have sufficient strength to withstand handling and load stresses normally encountered during and following installation of the pipe.
- D. HDPE pipe/fittings shall be joined into continuous lengths above grade on site whenever possible. Pipe shall be joined on site in appropriate working lengths near the insertion pit. HDPE pipe shall be assembled and stored where accesses to homes, businesses, mailboxes, etc. are not disrupted.
- E. Contractor shall pre-assemble as much pipe as possible before beginning insertion process. If additional pipe is needed, pipe shall be joined as it is being inserted.
- F. Pipe lengths shall be stored in a manner and location as to protect the pipe from scouring, gouging, or other damage. Internal scouring and external cuts or abrasion deeper than 10% of the wall thickness or pipe sections found to be out of round shall not be used as replacement pipe.
- G. The joints shall be leak proof, thermal, butt-fused joints. All fusing shall be done using tools recommended by the pipe supplier and approved by the Owner. Operators shall be certified by the pipe manufacturer. The fusing machine shall have hydraulic pressure control for fusing two pipe ends together. The ends of pipe shall be trimmed to form perpendicular faces prior to fusing. The heating plate on the fusing machine shall be electrically heated and thermostatically controlled and shall contain a temperature gauge for monitoring temperature. The heating plate shall be subject to periodic inspection, using a temperature stick, to assure even heating.
- H. Joints between pipe sections shall be smooth on the inside. Internal projection beads shall be removed from each pipe joint prior to installation of the pipe. Joints between pipe sections shall not exhibit internal beads that protrude into the pipe more than ¼-inch. The bead remnants shall be removed from the pipe prior to installation and disposed of. The notch between the beads shall not protrude past the outside limits of the wall of the pipe.
- I. Two joints, selected at random by the Owner from the first total of 1,000 feet shall be tested in compliance with ASTM D638 to ensure that the tensile strength of yield of the butt fusion joints equals or exceeds that of the pipe. The test specimen shall be obtained by cutting the liner pipe at least twelve inches on each side of the field made joint. One additional test shall be made for each additional 1,000 feet of line or portion thereof.
- J. The butt-fused joint shall provide true alignment between the joined pipes and shall have uniform roll back beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to that of the pipe. All joints shall be inspected prior to insertion and shall be subject to

acceptance by the Owner. All defective joints shall be cut out and replaced at no cost to the Owner.

- K. Side sewer saddle tees shall be reinstated by attaching a molded branch fusion saddle tee to the HDPE sewer main using thermal sidewall fusion or electrofusion sewer saddle tees. Install molded branch fusion saddle tees using procedures and equipment as referenced in manufacturer's written installation instructions. Prior to installation of side sewer tees, sewer main pipe shall be less than 5% ovality. Sewer main pipe exceeding 5% ovality shall be re-rounded or replaced before installing side sewer tees at no additional cost to the Owner.

3.3 TESTING HDPE PIPE AND SADDLE TEES

- A. Before acceptance testing is performed, the replacement sewer main pipe shall be clean. The sewer main pipe shall be cleaned before testing in the manner described or in an alternative manner as approved by the Owner.
- B. Following completion of inserting the HDPE pipe and prior to connecting lateral service connections, each segment of HDPE pipe shall be pressure tested. The pipe shall be subjected to an air test of 4 psig for ten (10) minutes with no measurable pressure loss. Failure of the pressure test shall be cause for rejection of the installation.
- C. All sidewall fusion and electrofusion saddle tees shall be individually air pressure tested prior to cutting hole in sewer main pipe. Saddle tees that cannot be tested in this manner shall not be used. The saddle tee shall be subjected to an air test of 4 psig for ten (10) minutes with no measurable pressure loss. Failure of the pressure test shall be cause for rejection of the installation.
- D. If leakage occurs, the Contractor shall determine the source(s) of any leakage and shall repair or replace the line and conduct a re-test at no additional cost to the Owner. Proposed repairs shall be approved by the Owner.
- E. Contractor shall furnish all facilities and personnel for conducting the pressure tests under the observation of the Engineer.
- F. The complete pipe installation shall meet the requirements of this test, before being considered acceptable.

* * * END OF SECTION * * *

SECTION 02640 VALVES

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Excavating, Backfilling and Compacting for Utilities: Section 02222
- C. Pipe and Fittings: Section 02610

1.2 QUALITY ASSURANCE

- A. Testing by Manufacturer:
 - 1. Manufacturer shall test all materials as required by these specifications and the standards referenced.
 - 2. Manufacturer shall submit to the Engineer two (2) copies of all test results which shall include a certification that materials to be delivered are represented by the samples tested and that such delivered materials meet or exceed the specification requirements.
 - 3. No materials shall be delivered until test results and certifications are in the hands of the Engineer.
 - 4. Engineer shall have free access to all testing and records pertaining to materials to be delivered to the job site.
 - 5. The Engineer may elect to be present at any or all materials testing operations.

2. PRODUCTS

2.1 GATE VALVES - (UNDER 12 INCHES)

- A. Conform to AWWA C509.
- B. Iron body, bronze stem, resilient wedge.
- C. O-ring stuffing box.
- D. Open counter-clockwise unless otherwise specified.
- E. Non-rising stem type.
- F. Equipped with a 2 inch standard operating nut.
- G. Mechanical joint or push on joint suitable for installation with the type and class of pipe being used or flanged where detailed.
- H. All flange faces shall be machined. Flanges shall be drilled to straddle vertical centerline.

2.2 GATE VALVES - (12 INCHES AND LARGER)

- A. Conform to applicable provisions of Article 2.1 for gate valves under 12 inches and the following additional requirements.
- B. Arranged for operation in the horizontal position.
- C. Equipped with bronze tracks fastened into a groove or slot within the valve body casting, together with bronze rollers, shafts, bushings and scrapers.
- D. Gears shall be cut tooth steel gears, housed in heavy cast iron extended type grease cases.
- E. Equipped with bypass of the size adopted as standard in the AWWA specification.
- F. Provide three certified copies of performance tests, as specified in Section 5 of AWWA C509 to the Engineer for review.

2.3 BUTTERFLY VALVES

- A. Conform to AWWA C504, Class 250B.
- B. Suitable for direct burial.
- C. Mechanical joint or push on joint suitable for installation with type and class of pipe being used or flanged where detailed.
- D. Standard O-ring shaft seal.

- E. Operator shall be traveling nut or worm gear type, sealed, gasketed and permanently lubricated for underground service.
- F. Operator shall be designed to withstand all anticipated operating torques and designed to resist submergence in ground water.
- G. Equipped with a standard 2 inch operating nut.
- H. Open counter-clockwise.
- I. Flanges shall be drilled to match fittings.

2.4 STEM EXTENSION

- A. Provide stem extension with standard operating nut and self centering rock plate support for all valves with operating nut more than 4 feet below grade to raise operating nut to within 36 inches of the ground surface.

2.5 VALVE BOXES

- A. Provide for all buried valves.
- B. Valve boxes and tops shall be cast iron 2 piece slip joint type.
- C. Lengths suitable for the particular project or as specified.
- D. Base corresponding to size of valve.
- E. Cover shall have the word "Water" cast on it.

2.6 VALVE MARKER POST

- A. Shall have a 4-inch minimum square section and a minimum length of 42 inches, with beveled edges.
- B. Contain at least one No. 3 bar reinforcing steel.
- C. Paint exposed portion of the marker posts with two (2) coats of concrete paint in a color selected by the Owner.
- D. Stencil the size of the valve and the distance in feet and inches to the valve on the face of the post, using black paint and a stencil which will produce letters 2 inches high.

2.7 COMBINATION AIR RELEASE VALVE

- A. Designed to operate with potable water under pressure to allow entrapped air to escape from the pipeline.
- B. Body and cover: Cast iron conforming to ASTM A48, Class 30.
- C. Floats: Stainless steel conforming to ASTM A240 and designed to withstand 1,000 psi pressure.
- D. Seats: Buna N rubber.
- E. Internal Parts: Stainless steel or bronze.
- F. Designed to withstand 300 psi pressure with normal operating pressure under 100 psi.
- G. Manufactured by APCO or equivalent with following listed orifice sizes:

<u>Model No.</u>	<u>Size of Valve</u>	<u>Large Orifice</u>	<u>Small Orifice</u>
143C	1"	1"	5/64"
145C	2"	2"	3/32"
147C	3"	3"	3/32"

- H. Vault shall be precast concrete meter box or utility vault as indicated on the detail.

2.8 COMBINATION SEWAGE AIR AND VACUUM RELEASE ASSEMBLY

- A. Combination sewer air and vacuum release assembly shall consist of an air release valve and an air and vacuum valve.
- B. Valves shall be constructed for minimum pressure of 150 psi. Some valves may operate at certain times at less than 20 psi. Supplier shall evaluate normal operating conditions for each valve and furnish a valve capable of seating under normal conditions.
- C. Assembly shall be manufactured by APCO or equivalent, Series 400.

- D. Air release valves shall be especially adopted for use with sewage and shall be designed to vent gases under pressure:
 - 1. Body and cover: Cast iron conforming to ASTM A48, Class 30.
 - 2. Float and pins in mechanism: Stainless steel conforming to ASTM A240. Float shall be designed to withstand a minimum pressure of 1,000 psi. Float stem shall be elongated to provide an air gap between the mechanism and the sewage.
 - 3. Seats: Bronze.
 - 4. Mechanisms: Bronze or stainless steel.
- E. The sewage air and vacuum valve shall be specially designed for use with sewage and shall be designed to vent large quantities of air when filling the line and to allow air to re-enter the line when the line is being drained:
 - 1. Body, cover and baffle: Conforming to ASTM A48, Class 30.
 - 2. Two floats having a common stainless steel float guide shall be provided. Floats shall be stainless steel conforming to ASTM A240 and designed to withstand a minimum pressure of 1,000 psi.
 - 3. Seats: Buna N rubber.
 - 4. Float stem and guides: Bronze or stainless steel.
- F. Valves shall be provided with quick disconnect couplings and valves to permit back flushing without dismantling.
- G. Vault Cover:
 - 1. Design Load: H-20 traffic load 300 PSF minimum.
 - 2. Door Leaf: 5/16 inch steel diamond pattern plate.
 - 3. Access door shall be single leaf type, Utility Vault Co. or equivalent.
 - 4. Door and frame shall be for dimensions shown.
 - 5. Provide spring assisted operators for opening and hold open arm with release handle.
 - 6. Provide recessed padlock hasp.
 - 7. Hardware shall be cadmium plated. Factory finish shall be prime coat of red oxide applied to steel doors and frames.
- H. Vault shall be precast concrete utility vault as manufactured by utility vault company or equivalent designed for H-20 traffic loads.
- I. Vent shall be galvanized steel pipe.

2.9 VALVE VAULT HEATER

- A. Provide when insulated vault is specified.
- B. Conform to requirements of National Electric Code (NEC) latest edition.
- C. Contractor to provide electrical service at his expense.

2.10 TAPPING SLEEVE AND VALVE ASSEMBLY

- A. Furnished with flanged inlet end connections having a machined projection on the flanges to mate with a machined recess on the outlet flanges of the tapping sleeves and crosses.
- B. Outlet ends shall conform in dimensions to the AWWA Standards for hub or mechanical joint connections, except that the outside of the hub shall have a large flange for attaching a drilling machine.
- C. Seat opening of the valves shall be larger than normal size to permit full diameter cuts.
- D. Tapping sleeves shall be cast iron, stainless steel, epoxy coated steel, or other approved materials.

3. EXECUTION

3.1 GATE VALVE OR BUTTERFLY VALVE INSTALLATION

- A. Valves shall be accurately set at places designated on the drawings.

- B. Inspect each valve for defects.
- C. Adjust stuffing boxes to ensure water tightness without binding the stem.
- D. Set valve and valve box plumb.
- E. Set lower casting of valve box so that it is supported by a Styrofoam collar not less than 2 inches in thickness.
- F. Tamp backfill around valve box to a minimum distance of 3 feet on all sides or to face of trench.
- G. Set valve box cover flush with surface.

3.2 VALVE MARKER POST

- A. Where required, set valve marker post at edge of right-of-way opposite the valve.
- B. Leave 18 inches of post exposed above grade.

3.3 INSTALLATION OF COMBINATION AIR RELEASE VALVE

- A. Install in accordance with standard detail.
- B. Locate so that high point of water main is vented.
- C. Pipe between main and valve shall slope upward.
- D. Locate valve adjacent to property line unless otherwise indicated.

3.4 INSTALLATION OF COMBINATION SEWAGE AIR AND VACUUM RELEASE ASSEMBLY

- A. Install in accordance with standard detail.
- B. Locate so that high point of sewage force main is vented.
- C. Adjust grade of force main so that valve assembly can be properly installed.
- D. Pipe shall slope upward from force main to valve assembly.
- E. Locate valve adjacent to property line unless otherwise indicated.

3.5 BLOCKING

- A. Provide blocking for valve not connected to fitting with bolted connection.

3.6 TESTING

- A. Test valves along with pipeline in which they are installed.

* * * END OF SECTION * * *

SECTION 02730 SANITARY SEWERS

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Dewatering: Section 02140
- C. Shoring: Section 02150
- D. Excavating, Backfilling and Compacting for Utilities: Section 02222
- E. Manholes and Cleanouts: Section 02605
- F. Pipe and Fittings: Section 02610
- G. Existing Utilities/Facilities Underground and Overhead: Section 02760

1.2 QUALITY ASSURANCE

- A. Testing Before Acceptance:
 - 1. The Engineer may require that the first section of pipe, not less than 300 feet in length, installed by each of the Contractor's crews be tested in order to qualify the crew and/or the materials.
 - 2. Pipe laying shall not be continued more than an additional 300 feet until the first section has been tested successfully.
- B. Final Acceptance:
 - 1. Prior to final inspection all pipelines shall be flushed and cleaned and all debris removed.
 - 2. Before sewer lines are accepted, all lines shall be tested as specified herein and inspected for line and grade by checking each section between manholes for alignment. A full circle of light shall be seen by looking through the pipe at a light held in the manhole at the opposite end of the section of sewer line being inspected.
 - 3. All lines shall be tested for leakage.
 - 4. Deflection test shall be performed on all flexible pipe, where in the Owner's opinion, video inspection warrants it.
 - 5. All lines shall be video inspected.
 - 6. Any corrections required shall be made at the expense of the Contractor and the line retested.

1.3 PROTECTION OF LIVE SEWERS

- A. All existing live sewers including septic tanks and drain fields shall remain in service at all times. Adequate provision shall be made for disposal of existing sewage flow if any existing sewers are damaged.
- B. Any damage to the Owner's existing system shall be repaired to a condition equal to or better than that existing prior to the damage at no cost to the Owner.
- C. The existing system is discharged through some sewers with flat grades and in some cases through lift stations. All water accumulating during construction shall be removed from the new sewers and shall not be permitted to enter the existing system. The Contractor will be required to flush out the existing lines and/or repair lift stations or other facilities if gravel, rocks or other debris are permitted to enter the existing lines.
- D. The physical connection to an existing manhole or sewer line shall not be made until so authorized by the Owner. This authorization will not be given until all upstream lines have been completely cleaned, all debris removed, and where applicable, a pipe temporarily placed in the existing channel and sealed.

1.4 USE OF SEWERS PRIOR TO COMPLETION

- A. The Owner hereby reserves the right to make use of any portion of the work prior to completion of the entire Contract without invalidating the Contract and without constituting acceptance of any of the work.

2. PRODUCTS

2.1 BEDDING MATERIALS

- A. Refer to Section 02222.

2.2 GENERAL REQUIREMENTS FOR PIPE MATERIAL

- A. Pipe used for sewer construction shall be specified in Section 02610 unless otherwise provided.
- B. All pipe shall have flexible watertight joints utilizing rubber gaskets, unless otherwise specified.

3. EXECUTION

3.1 SURVEY LINE AND GRADE

- A. The Contractor shall constantly check line and grade of the pipe and in the event they do not meet specified limits, the work shall be immediately stopped, the Engineer notified, and the cause remedied before proceeding with the work.

3.2 BEDDING

- A. Proper preparation of foundation, placement of foundation material where required, and placement of gravel bedding shall precede the installation of all sewer pipe. This shall include the necessary preparation of the native trench bottom and/or the top of the foundation material as well as placement and compaction of required gravel bedding to a uniform grade. Gravel bedding around the pipe will be placed in a manner to meet requirements specified herein.
- B. Class F bedding shall be provided for all flexible pipe.
- C. The gravel bedding shall be placed so that the entire length of the pipe will have full bearing on the bedding. No blocking of any kind shall be used to adjust the pipe to grade except when used with embedment concrete. Bell holes shall be dug to assure uniform support along the pipe barrel.
- D. It may be necessary to change bedding classifications and the limits thereof during the progress of the construction, consistent with the requirements outlined under the definitions and requirements of the various classifications contained herein.
- E. Where unauthorized excavation has been made below the established grade, the Contractor shall provide, place and compact suitable bedding material to the proper grade elevation at his own expense.
- F. Classification of Bedding:
 - 1. Class A (Special Concrete Bedding) shall consist of a pipe cradle constructed of Portland cement concrete containing not less than four (4) sacks of cement per yard. Maximum aggregate size shall be 1/2 inches. Maximum slump shall be 4 inches. The Contractor shall protect pipe against flotation during the pouring of the concrete. The bottom of the trench shall be fully compacted before placement of pipe or cradle. Cradle construction shall conform to the Standard Detail.
 - 2. Class B (Normal Gravel Bedding) shall consist of the leveling of the bottom of the trench and/or the top of the foundation material at the appropriate elevation, and the furnishing and placing of gravel bedding under the pipe and along the sides of the pipe. Minimum thickness of the layer of gravel bedding required under any portion of the pipe shall be four inches for all pipe sizes of 27 inches diameter and smaller, and six inches for all pipe sizes of 30 inches diameter and larger. Bedding shall extend up to the mid-point of rigid pipe. Gravel bedding shall be

carefully placed and firmly compacted to provide a firm, uniform cradle for the pipe.

3. Class C (Shallow Gravel Bedding) shall meet the requirements outlined for Class B bedding except that gravel bedding need be placed only to the lower quadrant of the pipe. This type of bedding will be used only where specifically designated on the Plans and only for shallow pipelines.
4. Class D (Native Bedding) shall consist of carefully excavating the trench to proper grade and placing select native material around the pipe. Native bedding, as described, shall be considered as incidental to the construction and all costs thereof are included in the unit contract price of the Contract. Native bedding shall be used only where specifically called for or specifically authorized by the Engineer.
5. Class F bedding shall be placed in more than one lift. The first lift to provide at least 4-inch thickness under any portion of the pipe shall be placed before the pipe is installed and shall be spread smoothly so that the pipe is uniformly supported along the barrel. Subsequent lifts of not more than 6-inch thickness shall be placed to 6 inches over the crown on the pipe and individually compacted to 95% of maximum density. Material shall be gravel bedding material described in Section 02222.

3.3 PIPE LAYING

- A. Laying of sewer pipe shall be accomplished to line and grade in the trench only after it has been dewatered and the foundation and/or bedding has been prepared.
- B. Mud, silt, gravel and other foreign material shall be kept out of the pipe and off the jointing surfaces.
- C. Pipe laid shall be retained in position by mechanical means or otherwise, as to maintain alignment and joint closure until sufficient backfill has been completed to adequately hold the pipe in place. Wherever moveable shoring (steel box) is used in the ditch, pipe shall be restrained by use of a winch mounted in the downstream manhole and a line of sufficient strength threaded through the pipe and set tightly before each move. Any indication that joints are not being adequately held shall be sufficient reason to require this or other equivalent method of restraint, whether or not moveable shoring is being used.
- D. Variance from established line and grade shall not be greater than 1/32 of an inch per inch of pipe diameter, not to exceed 1/2 inch provided that such variation does not result in a level or reverse sloping invert; provided also, that variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed 1/64 inch per inch of pipe diameter, 1/2 inch maximum.
- E. The sewer pipe shall be laid upgrade from point of connection on the existing sewer or from a designated starting point. The sewer pipe shall be installed with the bell end forward or upgrade.
- F. When pipe laying is not in progress the forward end of the pipe shall be kept tightly closed with a temporary plug.
- G. As the pipe is installed, it shall be backfilled with the specified gravel bedding material up to an elevation 6 inches above the pipe crown, taking care that the gravel bedding is in contact with the entire periphery of the pipe. The gravel bedding shall be so carefully placed and firmly compacted that the subsequent backfilling operations will not disturb the pipe in any way.
- H. Pipe branches, stubs or other open ends that are not to be connected immediately shall be plugged with approved material consistent with these Specifications and secured in place.

3.4 PIPE JOINTING

- A. All extensions, additions and revisions of the sewer system, unless otherwise specified, shall be made with sewer pipe jointed by means of a flexible gasket which shall be fabricated and installed in accordance with these Specifications.
- B. Pipe handling after the gasket has been affixed shall be carefully controlled to avoid disturbing the gasket and knocking it out of position, or loading it with dirt or other foreign material. Any gaskets so disturbed shall be removed and replaced, cleaned and re-lubricated if required before the jointing is attempted.
- C. Care shall be taken to properly align the pipe before joints are entirely forced home. During insertion of the tongue or spigot, the pipe shall be partially supported by hand, sling or crane to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned. Since most flexible gasketed joints tend to creep apart when the end pipe is deflected and straightened, such movement shall be held to a minimum once the joint is home.
- D. Sufficient pressure shall be applied in making the joint to assure that it is home, as described in the installation instructions provided by the pipe manufacturer. Sufficient restraint shall be applied to the line to assure that joints once home are held so, until fill material under and alongside the pipe has been sufficiently compacted.
- E. At the end of the work day, the last pipe laid shall be blocked to prevent creep during "down time."
- F. For dissimilar pipes where suitable adaptor couplings are not available, the jointing shall be accomplished with a special factory fabricated coupling.

3.5 SIDE SEWER STUBS

- A. All applicable Specifications given herein for sewer construction shall apply to side sewers.
- B. Provide side sewer stubs extending to the right of way line for all properties adjacent to main line sewer unless otherwise directed by the Owner.
- C. Unless authorized in writing by the Owner, excavation for main line sewers shall not begin more than 1,000 feet ahead of the completion of side sewer construction in the public right-of-way.
- D. Sewers are designed to serve the downstream side of properties. Exceptions shall be as directed by the Owner at the time of construction. Such exceptions shall be marked by a stake or other suitable marker. Contractor shall be responsible that a "tee" be located in the main line opposite each marker and shall construct a side sewer to terminate at the property lines, edge of easements, or as otherwise directed by the Owner.
- E. The Contractor shall be responsible that the side sewer depth at the property line is 5 feet below the floor to be served, or 6 feet below street centerline, whichever is deeper. Where the property is vacant, the side sewer shall be constructed on a slope of 2% unless otherwise approved in writing by the Owner.
- F. Side sewer stubs shall not be installed as vertical risers, but shall be laid on a slope not to exceed two feet vertical to one foot horizontal.
- G. Side sewer stubs shall be constructed with a maximum deflection not to exceed manufacturer's recommendations. Larger changes in direction shall be made by use of standard 1/8 bends.
- H. Plugs shall be installed at end of line and blocked to withstand test pressures without leakage.
- I. A 1¼-inch white PVC pipe, ASTM 2241 SDR 21 200 psi shall be placed vertically at the end of the side sewer stub and shall rise 2 feet above finish grade level. Both

ends of the PVC pipe shall have caps glued on and the pipe interior kept clean for the purpose of future depth measurement.

- J. General requirements for side sewer stub construction are shown on Standard Detail entitled "Street Side Sewer". Any side sewer contractor shall also satisfy all requirements relating to side sewer construction as set forth in the "Side Sewer Rules and Regulations" of the Owner. Side sewer inspection for work under the Contract will be performed without charge to the Contractor.
- K. No side sewers shall be constructed inside private property unless approved in writing by the Owner.
- L. The Contractor shall not backfill any side sewer stub until the Owner has visually inspected and approved the installation. Should any such work be covered up without such approval or consent it must, if required by the Owner, be uncovered for examination at the Contractor's expense.

3.6 CLEANING

- A. Before acceptance testing is performed, the pipe installation should be reasonably clean. The pipe shall be cleaned either before or after testing the pipe in the following or equivalent manner.
- B. The Contractor shall furnish an inflatable rubber ball of a size that will inflate to fit snugly into the pipe to be tested. The ball may, at the option of the Contractor, be used without a tag line; or a rope or cord may be fastened to the ball to enable the Contractor to know and control its position at all times. The ball shall be placed in the last cleanout or manhole on the pipe to be cleaned, and water shall be introduced behind it. The ball shall pass through the pipe with only the pressure of the water impelling it. All debris flushed out ahead of the ball shall be removed at the first manhole where its presence is noted. In the event cemented or wedged debris or a damaged pipe shall stop the ball, the Contractor shall remove the obstruction and/or repair any damaged pipe. All visible leaks showing flowing water in pipelines or manholes shall be stopped even if the test results fall within the allowable leakage.

3.7 LEAKAGE TESTING

- A. General Requirements:
 - 1. All sanitary sewer pipe and appurtenances shall be cleaned and tested after backfill by the low-pressure air test method. Pipe over 36 inches in diameter may be tested a joint at a time with the water exfiltration method or by low pressure air test.
 - 2. All work involved in cleaning and testing sewer lines between manholes shall be completed within fifteen (15) working days after the backfilling of sewer lines and structures.
 - 3. The Contractor shall furnish all labor, materials, tools and equipment necessary to make the test, to clean the lines and to perform all work incidental thereto.
 - 4. Precautions shall be taken to prevent joints from opening during tests, and any damage resulting from tests shall be repaired by the Contractor at his own expense.
 - 5. In the event that the Contractor elects to test large diameter pipe one joint at a time, leakage allowances for water exfiltration per 100 feet shall be converted to allowances per joint by dividing by the number of joints occurring in 100 feet.
 - 6. If the pipe installation fails to meet these requirements, the Contractor shall determine at his own expense the source or sources of leakage, and he shall replace all defective materials or workmanship. The completed pipe installation shall then be retested as required to meet the requirements of this test.

B. Low Pressure Air Test:

1. Recommended Procedure:

- a. Pipe may be tested with or without pre-wetting.
- b. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
- c. If the pipe to be tested is submerged in groundwater, insert a pipe probe by boring or jetting into the backfill material adjacent to the center of the pipe and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to groundwater submergence over the end of the probe. All gauge pressures in the test should be increased by this amount.
- d. Add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to 4.0 psig in excess of any groundwater backpressure.
- e. Check exposed pipe and plugs for abnormal leakage by coating with a soap solution. If any failures are observed, bleed off air and make necessary repairs.
- f. After an internal pressure is obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
- g. After that two minute period, disconnect air supply.
- h. When pressure decreases to 3.5 psig over groundwater backpressure, start stopwatch. Determine the time in seconds that is required for the internal air pressure to drop 1.0 psig. This time interval should then be compared with the time required by Specification.

2. Safety Precautions:

- a. Plugs used to close the sewer pipe for the air test must be securely braced to prevent the unintentional release of a plug which can become a high velocity projectile. Gauges, air piping manifold and valves shall be located at the top of the ground. No one shall be permitted to enter a manhole where a plugged pipe is under pressure. Air testing apparatus shall be equipped with a pressure release device designed to relieve pressure in the pipe under test at 6 psi.

3. Basis of Acceptance:

- a. Concrete and clay pipe (36 inches and under): The rate of air loss shall not exceed 0.003 CFM per square foot of internal pipe surface except that the computed rate for the test shall be not less than 2 CFM nor more than 3.5 CFM.
- b. Other pipe materials: The time for the test shall be four (4) times that computed for concrete and clay pipe.
- c. Pipe over 36 inches in diameter: Each joint shall show no appreciable loss of pressure when held for thirty (30) seconds.

4. Limit of Test Section:

- a. Pipe less than 36 inches in diameter shall be tested from manhole to manhole or such shorter lengths as the Contractor may choose.
- b. Pipe over 36 inches in diameter shall be tested one joint at a time.

5. Excessive Infiltration:

- a. The Engineer may require an infiltration test if it appears that there is excessive infiltration after air tests are completed. The Engineer shall also be the sole judge of whether or not this test is required. Excessive infiltration shall be cause for rejection.

C. Exfiltration Test:

1. Exfiltration test shall be used only if specifically authorized by the Engineer.

2. Contractor may fill the pipe any time up to 24 hours prior to the time of exfiltration testing to permit normal absorption into the pipe walls.
3. Leakage shall be no more than 0.28 gph per inch diameter per 100 feet of sewer, with a hydrostatic head of six feet above the crown at the upper end of the test section, or above the natural groundwater table at the time of test, whichever is higher.
4. Where the test head is other than six feet, the measured leakage shall not exceed 0.28 gph per inch diameter per 100 feet times the ratio of the square root of the test head to the square root of six.
5. The length of pipe tested shall be limited so that the pressure at the lower end of the section tested does not exceed 16 feet of head above the invert, and in no case shall be greater than 700 feet or the distance between manholes when greater than 700 feet.
6. It shall be the Contractor's responsibility to determine the level of the water table at each manhole.

D. Infiltration Test:

1. Infiltration test shall be used only if specifically authorized by the Engineer.
2. Infiltration testing shall take place only when the natural groundwater table is above the crown of the higher end of the test section.
3. Infiltration test leakage shall not exceed 0.16 gph per inch diameter per 100 feet, when the natural groundwater head over the pipe is two feet or less above the crown of the pipe at the upper end of the test section.
4. Where the natural groundwater head is more than two feet, the measured leakage shall not exceed 0.16 gph per inch diameter per 100 feet times the ratio of the square root of the natural groundwater head to the square root of 2.
5. The length of pipe tested shall not exceed 700 feet or the distance between manholes when greater than 700 feet.

3.8 DEFLECTION TEST FOR FLEXIBLE PIPE

- A. Sanitary sewers constructed of flexible pipe shall be deflection tested not less than 30 days after the trench backfill and compaction has been completed.
- B. The test shall be conducted by pulling a solid pointed mandrel with a circular cross section with diameter equal to 95% of the inside pipe diameter through the completed pipeline. Minimum length of circular portion shall be equal to the diameter of the pipe.
- C. Testing shall be conducted on a manhole to manhole basis and shall be done after the line has been completely flushed out with water.
- D. Contractor will be required, at his expense, to locate and repair any sections failing to pass the test and to retest the section.

3.9 VIDEO INSPECTION

- A. The Owner requires all sewers to be inspected by the use of a video camera before final acceptance. The costs incurred in making the inspection shall be borne by the Contractor.
- B. A device will be attached in front of the camera to measure the depth of any ponding water.
- C. Any observed defects or ponded water with a depth of over 3/4 inch shall be cause for the rejection of the line.
- D. The Contractor shall bear all costs incurred in correcting any deficiencies found during television inspection including the cost of any additional television inspection that may be required by the Owner to verify the correction of said deficiency.
- E. The Contractor shall be responsible for all costs incurred in any video inspection performed solely for the benefit of the Contractor.

- F. Video equipment shall consist of a self-contained camera and a monitoring unit connected by three wire coaxial cable.
- G. Camera shall be small enough to ensure passage through a six-inch diameter sewer; 3-inch for side sewer inspections, shall be waterproof, and shall have a self-continuous 650-line resolution picture showing the entire inside periphery of the pipe.
- H. Furnish video recordings of the sewer lines on CD, DVD or flash drive in MP4 or similar file format readable by Windows Media Player, Quicktime, or TLC Video Player software.
- I. Video inspection shall be performed on one manhole section at a time by propelling the television camera through the line along the axis of the pipe. The inspection shall be performed in a forward (upstream) direction, unless otherwise allowed by the Owner.
- J. Video inspection shall result in a continuous recording, beginning with the camera above grade with a pan view of the immediate vicinity of the originating manhole, then continuing while camera is placed in sewer and advanced to end manhole or segment being inspected.
- K. The video inspection shall be done at a speed (maximum 0.5 feet per second) and quality that allows the Owner to identify all pipe defects and sewer branches.

3.10 REPAIRS

- A. Any pipe or appurtenance which has been laid or jointed that is not in conformance with the Specifications shall be repaired or be removed and replaced at the expense of the Contractor.
- B. Any concrete pipe or manhole with any continuous crack having a surface width of 0.01 inch or more extending for a length of 12 inches or more regardless of position in the wall of the pipe or main shall be removed and replaced.
- C. Repair bands or clamps or concrete collars shall not be used to repair defective pipe.

* * * END OF SECTION * * *

SECTION 02732 SEWER FORCE MAINS

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Dewatering: Section 02140
- C. Shoring: Section 02150
- D. Excavating, Backfilling and Compacting for Utilities: Section 02222
- E. Manholes and Cleanouts: Section 02605
- F. Pipe and Fittings: Section 02610
- G. Sanitary Sewer: Section 02730
- H. Existing Utilities/Facilities - Underground and Overhead: Section 02760

1.2 QUALITY ASSURANCE

- A. Testing Before Acceptance
 - 1. The Engineer may require that the first section of pipe, not less than 300 feet in length, installed by each of the Contractor's crews be tested in order to qualify the crew and/or the material.
 - 2. Pipe laying shall not be continued more than an additional 300 feet until the first section shall have been tested successfully.
- B. Final Acceptance:
 - 1. Prior to final acceptance all pipelines shall be flushed and cleaned of all debris and the line tested as specified herein.
 - 2. Any corrections required shall be made at the expense of the Contractor and the line retested.

2. PRODUCTS

2.1 BEDDING MATERIALS

- A. Conform to Section 02222.

2.2 PIPE MATERIALS

- A. Pipe used for sewer force main may be ductile iron or PVC pressure pipe as specified in Section 02610, unless otherwise noted.

3. EXECUTION

3.1 INSTALLATION

- A. Minimum depth of cover shall be 42 inches unless otherwise shown on the Drawings.
- B. Pipe shall be laid on a uniform grade with no sags or over bends between high and low points shown on the Drawings.
- C. Cover of sewage air valve assembly vault shall be accurately adjusted to grade and slopes of ground surface.

3.2 BEDDING FOR RIGID PIPE

- A. Bedding for rigid pipe except ductile iron shall be as specified in Section 02222.
- B. Unless otherwise ordered, bedding for ductile iron may be native bedding material, free of stones.
- C. Bedding shall be carefully placed under the pipe and to a depth of at least six (6) inches over the top of the pipe.
- D. Bedding shall be thoroughly rammed and tamped around the pipe with the proper tools, so as to provide firm and uniform support over the full length of all pipe, valves and fittings.
- E. Care shall be taken to prevent any damage to the pipe or its protective coating.

3.3 BEDDING FOR FLEXIBLE PIPE

- A. Material to be used for bedding for flexible pipe shall be sand/gravel material as specified in Section 02222.
- B. Bedding shall be placed in more than one lift. The first lift is to provide at least 4-inch thickness under any portion of the pipe and shall be placed before the pipe is installed, and shall be spread smoothly so that the pipe is uniformly supported along the barrel.
- C. Subsequent lifts of not more than 6-inch thickness shall be installed to 6 inches over the crown of the pipe and individually compacted to 90 percent of maximum density.

3.4 PIPE LAYING

- A. Pipe laying shall be done in accordance with the Specifications and instructions of the manufacturer of the kind of pipe used.
- B. Tools designed especially for installing each particular type and kind of pipe shall be used.
- C. Short Lengths and Field Cut Joints:
 - 1. Short lengths of pipe supplied by the manufacturer shall be used to provide the proper spacing of valves, tees or special fittings.
 - 2. Whenever it becomes necessary to cut a length of pipe, the cut shall be made by abrasive saw or by a special pipe cutter.
 - 3. Pipe ends shall be square with the longitudinal axis of the pipe and shall be reamed and otherwise smoothed so that good connections can be made.
 - 4. Threads shall be cleanly cut.
 - 5. All operations for any connection shall be carefully done in accordance with the manufacturer's instructions.
- D. Laying of Pipe on Curves:
 - 1. Long radius curves, either horizontal or vertical, may be laid with standard pipe by deflections at the joints or by the use of shorter lengths of pipe.
 - 2. When pipe is laid on a curve, the pipe shall be jointed in a straight alignment and then deflected to the curved alignment.
 - 3. Where field conditions require deflection or curves not anticipated by the Plans, the Contractor shall use deflected joints, short lengths or special fittings as required. No additional payment will be made for laying pipe on curves as shown on the Plans or for field changes involving pipe deflected at the joints. When special fittings not shown on the Plans are required to meet field conditions, additional payment will be made for fittings.
 - 4. Maximum deflections at pipe joints and laying radius for various pipe lengths shall be as recommended by the pipe manufacturer.

3.5 BLOCKING AND BRACING

- A. Blocking and bracing of the pipe and fittings shall be placed so as to secure bearing on undisturbed earth.
- B. Blocking and bracing size shall be determined by the Contractor and shall be of sufficient proportions and installed so as to withstand the required test pressure and operating conditions.
- C. Concrete shall be placed in back of all fittings with unbalanced thrust. Pre-cast blocking shall not be used.
- D. Blocking shall not be covered up without its having been seen by the Engineer.
- E. Blocking shall be formed so that bolts, joints, gaskets, and flanges of adjacent joints are clear of the concrete and so that bolts and joints can be dismantled without removing the concrete.
- F. At tees and crosses where future mains connect, a pre-cast concrete brick may be used between fittings and thrust block.

- G. Unless otherwise called for on the Bid Form, the cost of furnishing and installing all blocking shall be included in the price bid per lineal foot of pipe or lump sum bid if unit prices are not required.

3.6 PRESSURE TESTS

- A. Sewer force mains shall be subjected to the hydrostatic test described in Section 02660 except that pressure tests shall be made at a pressure equal to twice the working pressure of the pipe line or 75 psi in excess of the working pressure of the line, whichever is greater, unless otherwise specified.
- B. The pumps, gauges, plugs, saddles, corporations, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished and operated by the Contractor.
- C. Pipeline shall be backfilled sufficiently to prevent movement of pipe under pressure.
- D. Thrust blocks shall be in place and time allowed for the concrete to cure before testing.
- E. Procedure:
1. The mains shall be filled with water and all air removed prior to starting the test.
 2. The test shall be accomplished by pumping the main up to the required pressure; stop the pump for fifteen (15) minutes, and then pump the main up to the test pressure again.
 3. The quantity of water required to restore the pressure shall be accurately determined by pumping through a positive displacement water meter with a sweep unit hand registering 1 gallon per revolution. The meter shall be approved by the Engineer.
 4. Acceptability of the test will be determined by two factors:
 - a. The quantity of water lost from the main shall not exceed the number of gallons per hour as determined by the formula:
$$L = \frac{ND(P)^{0.5}}{7,400}$$
in which
L = Allowable leakage, gallons/hour
N = No. of joints in the length of pipeline tested
D = Nominal diameter of the pipe in inches
P = Average test pressure during the leakage test, psig
 - b. There shall not be an appreciable or abrupt loss in pressure during the fifteen (15) minute test period.
 5. Gauges used in the test shall be accompanied with satisfactory certifications of accuracy from a laboratory approved by the Engineer.
- F. Sections to be tested shall normally be limited to 1500 feet.
- G. Prior to calling out the Engineer to witness the pressure test, the Contractor shall have all equipment set up completely ready for operation and shall have successfully performed the test to assure himself that the pipe is in a satisfactory condition.

* * * END OF SECTION * * *

SECTION 02760

EXISTING UTILITIES/FACILITIES UNDERGROUND AND OVERHEAD

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Extra, Additional or Omitted Work - Payment: Article 13 General Conditions
- B. Inspection Services: Section 01420
- C. Excavating, Backfilling and Compacting for Utilities: Section 02222

1.2 LEGAL REQUIREMENTS UNDERGROUND FACILITIES

- A. The Contractor shall, before commencing excavation in any area, comply with the provisions of revised RCW 19.122 (E25HB 1634) and any other applicable laws relating to or governing the identification, location, marking, and responsibility for protecting and repairing of underground facilities.
- B. Whenever there may be a conflict between the provisions of any law and the provisions of these specifications, the provisions of law shall control.

1.3 DEFINITIONS

- A. Utility means any facility or item placed above or below ground for use in connection with the storage or conveyance of water, sewage, electronic, telephonic or telegraphic communication, cablevision, electric energy, petroleum products, gas, gaseous vapors, hazardous liquids, or other substances and including, but not limited to pipes, sewers, conduits, cables, valves, lines, wires, manholes, and attachments.
- B. Pipe zone is defined as extending from the bottom of the required excavation to six (6) inches over the top of the pipe.

1.4 IDENTIFICATION

- A. All underground utilities known by the Owner to be in the proposed area of excavation are identified on the project plan.
- B. The underground utilities identified on the plans have not and cannot be precisely located by the Owner or its agents or engineers and location is approximate only because such information is within the control of the owners of the underground utilities. The Owner, under this Contract, does not warrant the location of underground utilities.
- C. NOTICE: Overhead electrical service lines are generally not shown on the drawings. Electrical transmission lines shown on the drawings are located by point to point, power pole to power pole connections. The transmission cables or wires may be located on either side of the drawing location depending upon the configuration of the crossarms on the power poles or towers. Line voltage is not shown.
- D. Other overhead utility lines are generally not shown on the drawings.

1.5 NOTIFICATION

- A. It is the responsibility of the Contractor to give notice to the Owner or owners of any utilities known or suspected to be within the area of any proposed excavation or construction activities.
- B. The Contractor is responsible to have the locations of underground utilities marked by the utility owners prior to beginning excavation.
- C. The Contractor is responsible for determining the extent of any hazard created by electrical power in all areas and shall follow procedures during construction as required by law and regulation. Prior to construction, the Contractor shall meet with utility owners and determine the extent of hazards and remedial measures and shall take whatever precautions may be required.
- D. The Contractor's attention is directed to federal, state, and local safety codes relative to limitations of work in proximity to overhead power lines.

1.6 QUALITY ASSURANCE

- A. The Contractor will be required to have available a pipe finder and a person capable in its use and to utilize same to satisfy himself as to the exact location of such underground facilities in the interest of avoiding unnecessary damage, maintenance costs, and to insure continuity of customer service.
- B. Contractors shall cooperate with utility owners to aid in locations and maintenance of existing utilities.

1.7 ELECTRICAL TRANSMISSION AND SERVICE LINES

- A. Since neither the Engineer nor the Owner can anticipate the construction methods or techniques and equipment to be used by the Contractor in performing the work, the extent of the possibility of the Contractor's equipment and personnel coming in contact with electrical transmission lines cannot be fully anticipated, and there is no representation that all electrical transmission lines are shown on the plans.
- B. The Contractor is charged with the responsibility of observing and investigating the presence of any electrical transmission lines which might impinge on his work whether overhead or underground and shall consult with and utilize the information given by utility owners and operators to determine the extent of any hazards and remedial measures required, and follow appropriate safety procedures.

1.8 ABOVE GROUND UTILITIES

- A. Existing above ground utilities, whether shown on the drawings or not, shall be maintained, relocated, rerouted, removed and restored as may be necessary by the Contractor in a manner satisfactory to owners and operators of the utilities.

1.9 UTILITY SERVICE LATERALS

- A. Minor underground utility service lines, including but not limited to sanitary sewer services, gas services, water services, house or yard drains, and electricity or telephone services and driveway culverts shall be maintained, relocated, rerouted, removed and restored by the Contractor with the least possible interference with such services.
- B. Even though the presence of minor underground utility service lines may be deemed changed or differing conditions, in no case shall the interference of such service lines be the basis for extra compensation except in the case of a conflict, not shown on the plans, with sanitary sewer service occurring at an elevation between the top and bottom of the proposed pipeline or structure together with the pipe zone, the Contractor will be reimbursed for costs thereof in accordance with Article 13 of the General Conditions.

1.10 RESTORATION BY UTILITY OWNER

- A. The right is reserved by owners of public utilities and franchises to enter upon any street, road, right-of-way, or easement for the purpose of maintaining their property and for making necessary repairs or adjustments caused by the Contractor's operations.
- B. The Contractor shall save the Owner harmless of any costs so incurred in restoration of a utility damaged by the Contractor except in special cases outlined above, and subject to the provisions of any law.

1.11 RESTORATION OF DRAINAGE FACILITIES

- A. Where it is necessary for drainage facilities to be removed and replaced, existing pipe and catch basins may be reinstalled when approved by the agency having jurisdiction.
- B. The materials shall be cleaned.
- C. When it is necessary to replace existing pipe or catch basins, the new materials shall be of equal strength and similar design to existing materials.
- D. Installation shall be in accordance with the applicable provisions of these specifications.

- E. All costs, whether new or existing facilities are installed, shall be considered to be included in the unit prices bid for the various items and no additional payment shall be allowed.

* * * END OF SECTION * * *

SECTION 02990 LANDSCAPE RESTORATION

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Protection of Work and Property: Section 01545

1.2 SUBMITTALS

- A. Duplicate copies of a statement signed by the vendor certifying that each lot of seed has been tested by a recognized seed testing laboratory within 6 months before the date of delivery on the project.
- B. Duplicate copies of certification from grower certifying the grass species and locations of field from which sod was cut.

1.3 JOB CONDITIONS

- A. Areas landscaped and/or seeded prior to construction shall be restored to their original condition.
- B. Unless otherwise specified, the Contractor shall have the option of reseeding or resodding lawn areas that are disturbed during construction.
- C. A cover crop shall be sown in all areas other than landscaped areas that are excavated or disturbed during construction. Cover crop seeding shall follow backfilling operations by not more than three weeks. Weekly seeding shall be required for projects in which all backfilling cannot be completed in three weeks.
- D. All plants or shrubs within landscaped areas that are damaged during construction shall be replaced with plants equal to that existing prior to construction. Any covenants to stipulations in easements shall be adhered to.
- E. All areas shown on the Plans to be planted, seeded or sodded shall be accomplished in accordance with this section.

2. PRODUCTS

2.1 TOPSOIL

- A. Topsoil that is required to be furnished by the Contractor from a source other than the area upon which it will be placed shall consist of fertile, friable soil, preferably of a loamy character, typical of the topsoil common to the locality and it shall contain a normal amount of organic matter.
- B. It shall be obtained from arable land and shall be free from subsoil, refuse and other deleterious substances. It shall be reasonably free from brush, roots, heavy clay, sticks and other litter and shall contain no stones or gravel larger than 1/2 inch in diameter.
- C. It shall be free of toxic amounts of either acid or alkaline elements and be capable of sustaining healthy plant life.
- D. It shall be approved by the Engineer before placement.

2.2 SEED

- A. Grasses and legumes for cover crop seed shall conform to the standards of State Department of Agriculture. Seed shall be furnished in standard containers on which shall be shown the following information:
 - 1. Common name of seed
 - 2. Lot number
 - 3. Net weight
 - 4. Percentage of purity
 - 5. Percentage of germination (in case of legumes percentage of germination to include hard seed).
 - 6. Percentage of weed seed content and inert material clearly marked for each kind of seed in accordance with applicable state and federal laws.

2.3 FERTILIZER

A. General:

1. Fertilizer shall be a standard commercial grade of slow-release organic or inorganic fertilizer of the kind and quality specified herein.
2. All fertilizers shall be furnished in standard unopened containers with weight, name of plant nutrients, and manufacturer's guaranteed statement of analysis clearly marked, all in accordance with state and federal laws.
3. Fertilizer shall be ground to a fineness as required for the method of application.

B. Fertilizer Ratio:

Nitrogen	10
Phosphorus	4
Potassium	6

2.4 MULCH

A. Wood Cellulose Fiber:

1. Wood cellulose fiber mulch shall be specially processed wood fiber containing no growth or germination inhibiting factors and shall be dyed a suitable color to facilitate inspection of the placement of the material.
2. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material will become uniformly suspended to form homogeneous slurry.
3. Each package shall be marked by the manufacturer to show the air dry weight content.

B. Peat:

1. Peat shall be a natural domestic product of either sphagnum moss, reed or sedge peat, taken from a freshwater site, free from lumps, roots and stones.

C. Straw:

1. All straw mulch material shall be in an air dried condition free of noxious weeds, weed seeds, and other materials detrimental to plant life.
2. Straw shall be seasoned before baling or loading.
3. Straw mulch shall be suitable for spreading with mulch blower equipment.

2.5 SOD

A. Imported Sod:

1. Sod shall be of first quality turf grass sod composed of acceptable grass mixtures, relatively weed free.
2. Sod shall be machine cut to a uniform soil thickness not less than 3/4 inch or more than 1 inch. Individual sod pieces shall be cut to a standard width and to an acceptable length which provides for efficient and proper installation.
3. Sod shall be harvested, delivered and installed within a 48 hour period.
4. The Contractor, upon request, shall submit one standard piece of sod for the Engineer's approval.

B. Native Sod:

1. Native sod shall be replaced in the lawn of original removal.
2. The area of sod to be removed shall be laid out in squares or strips of such size as to provide easy handling and matching. The sod shall then be carefully cut along these lines taking care to keep all cuts straight and strips of the same width. After the sod has been cut vertically, it shall be removed to a uniform depth with an approved type of sod cutter. This operation shall be performed in such manner as to ensure uniform thickness of sod throughout the operation.
3. As the sod scalping proceeds, the sod strips shall be placed in neat piles at convenient locations and from then on they shall be maintained in a damp condition continuously until the sod strips are replaced on the lawn. In no case shall the sod remain in piles longer than 10 days before replacement on the lawn.

2.6 PLANT MATERIALS

- A. Plants shall be healthy, in vigorous growing condition, and be guaranteed true to size, name and variety. Nomenclature shall be listed in Standardized Plant Names, Second Edition, 1942.
- B. Size and quality shall be equal to existing plants or as shown on the Plans. Plants shall be No. 1, nursery grown, freshly dug, of normal growth and habit, free from diseases and insects.

3. EXECUTION

3.1 LAWN SEEDING

- A. All areas to be put into lawn shall have a minimum depth of 8 inches of topsoil.
- B. Immediately prior to placing topsoil, the surface area upon which it is to be placed shall be cleaned of objectionable matter and the area shall be smoothed and compacted.
- C. The finish grade of all areas to be put into lawn shall be smooth, without visible depressions or mounds and shall be flush with the top of adjoining curbs, walks and drives.
- D. After establishing the finish grade, all areas shall be hand raked, rolled and again hand raked, removing all rocks, weeds and debris.
- E. Commercial fertilizer shall be applied at the rate of 2 pounds per 1,000 square feet.
- F. Lawn seed shall be seeded over all areas to be put into lawn at the rate of 3 pounds per 1,000 square feet.
- G. After seeding, ground horticultural peat moss shall be spread 1/4 inch deep with an approved spreader over all seeded areas.
- H. The exact time for seeding will be determined by actual weather conditions. The normal satisfactory periods for seeding shall be considered as being between March 1 and May 1 and between September 15 and October 20.
- I. When delays in operations carry the work beyond the most favorable planting season, or when weather conditions are such that satisfactory results are not likely to be obtained for any stage of the seeding operations, the Contractor will stop the work and it shall be resumed only when the desired results are likely to be obtained or when approved alternates or corrective measures and procedures are adopted.
- J. Maintenance shall commence immediately on planting and the lawn area shall be kept damp for 10 days to 2 weeks. Protect all seeded areas by watering, mowing and replanting as necessary for at least 30 days and as long as necessary to establish a uniform stand of grass, and a minimum of 2 cuttings.

3.2 SOD

- A. Prior to placing the strips of sod, the scalped area shall be carefully shaped to proper grade and be thoroughly compacted. Wherever the construction operations have resulted in the placement of unsuitable or poorer soils in the area to be resodded, the surface shall be left low and covered with topsoil.
- B. The finished grade, after shaping and compacting the topsoil, shall be thoroughly dampened prior to and immediately before replacing the sod.
- C. The sod shall be replaced to the required grade, taking care to butt each piece tightly against the adjacent one.
- D. Upon completion, the sod shall be dampened and rolled with a lawn roller.
- E. All sod shall be kept moist during the first week after sodding. Water shall be provided for each of the next three weeks to provide a minimum of 2 inches of moisture per week.

3.3 COVER CROP SEEDING

- A. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet or otherwise untillable.
- B. Seed may be sown by one of the following methods:

1. Hydroseeded which utilizes water as the carrying agent, and maintains continuous agitation through paddle blades. It shall have an operating capacity sufficient to agitate, suspend and mix into homogeneous slurry of the specified amount of seed and water or other material. Distribution and discharge lines shall be large enough to prevent stoppage and shall be equipped with a set of hydraulic discharge spray nozzles which will provide a uniform distribution of the slurry.
 2. Blower equipment with an adjustable disseminating device capable of maintaining a constant, measured rate of material discharge that will ensure an even distribution of seed at the rates specified.
 - C. Grass seed shall be seeded at the rate of 130 pounds per acre.
 - D. Fertilizer shall be applied at the rate of 90 pounds per acre.
 - E. Wood cellulose fiber shall be applied at the rate of 1 ton per acre.
 - F. The exact time for seeding will be determined by actual weather conditions. The normal satisfactory period for seeding shall be considered between March 1 to June 1 and September 1 to November 1 unless otherwise authorized by the Owner except that the Contractor may perform seeding operations from June 1 to September 1 provided that he waters the new grass to the satisfaction of the Owner.
 - G. When delays in operations carry the work beyond the most favorable planting season, or when weather conditions are such that satisfactory results are not likely to be obtained for any stage of the seeding operations, the Contractor will stop the work and it shall be resumed only when the desired results are likely to be obtained or when approved alternates or corrective measures and procedures are adopted.
 - H. The Contractor shall protect all seeded areas from erosion until final inspection and acceptance has been made. Areas damaged by erosion shall be repaired by the Contractor at his own expense.
- 3.4 PLANTING PITS
- A. Trees: Vertical sides, flat bottom, circular or square 6-inch minimum planting soil below ball and/or roots, diameter or side dimension 2 feet greater than root system or ball diameter.
 - B. Shrubs conform to A above except diameter or side dimension 1 foot greater than ball diameter or root.
 - C. Bulbs, bedding plants and ground cover 12 inches below finished grade.
- 3.5 PLANTING TREES, SHRUBS, GROUND COVER, BULBS AND BEDDING PLANTS
- A. Use planting soil beneath and around cavity between plant ball or roots and pit sides. Tamp base firmly, place plant or tree, tamp soil in layers, thoroughly water each layer, loosen and fold burlap away from top of ball into pit. Fill balance of cavity with planting soil. Soak and continuously maintain adequate moisture.
 - B. Use approved root transplanting compounds and herbicides for bulbs and plants to prevent disease and assure best plant growth.
 - C. Leave watering "saucers" around each plant.
 - D. Support trees immediately after planting by staking and/or guying to maintain trees in plumb position.
 - E. Apply mulch where shown or noted on the Drawings. Mulch depth shall be 3 inches unless otherwise noted.
 - F. Fertilize all trees, shrubs and ground covers at time of planting.
- 3.6 FINAL INSPECTION
- A. Final inspection for seeded areas will not be made until thirty (30) days following completion of all seeding, fertilizing, and mulching as specified. Damage caused by the Contractor to areas which have been seeded or sodded shall be repaired and/or replaced by the Contractor at his own expense.

3.7 GUARANTEE

- A. Guarantee of planting and seeding shall continue for one year from date of final project acceptance. Contractor shall replace all plants or sod dead or dying within the guarantee period, or reseed lawns and cover crop where required. Guarantee shall include both materials and labor. Replacements shall be the same as originally planted.

* * * END OF SECTION * * *